RISK FACTORS FOR MIGRAINE IN PEOPLE WITH EPILEPSY

A THESIS SUBMITTED TO

BABA FARID UNIVERSITY OF

HEALTH SCIENCES, FARIDKOT (PUNJAB)

IN THE PARTIAL FULFILLMENT

FOR THE AWARD OF DEGREE OF

DOCTORATE OF MEDICINE

IN

NEUROLOGY

MAY 2023

Submitted By

DR. SAURABH SULTANIA

DEPARTMENT OF NEUROLOGY
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA, PUNJAB

DECLARATION BY THE CANDIDATE

I hereby declare that the thesis entitled **"RISK FACTORS FOR MIGRAINE IN PEOPLE WITH EPILEPSY"** submitted towards partial fulfillment of the requirements for the award of **DM NEUROLOGY** degree to BFUHS is a compilation of original work carried out by me under the supervision of **Dr. Gagandeep Singh,** Professor & Head, Department of Neurology, **Dr. Monika Singla**, Associate Professor, Department of Neurology, & **Dr. Jatinder Singh Goraya**, Professor, Department of Paediatrics. No part of this thesis has formed the basis for the award of any degree previously.

_____

DR. SAURABH SULTANIA
Department of Neurology
Dayanand Medical College & Hospital,
Ludhiana, Punjab

Date:

Place:

CERTIFICATE OF SUPERVISORS

This is to certify that the work incorporated in this thesis entitled **"RISK FACTORS FOR MIGRAINE IN PEOPLE WITH EPILEPSY"** has been carried out by **Dr. Saurabh Sultania** under our direct supervision. The data incorporated in this thesis is original and genuine and has been carried out by the candidate himself.

Signature of Supervisor

Dr. Gagandeep Singh
Professor& Head
Department of Neurology
DMCH, Ludhiana

Signature of Co-Supervisors

Dr. Monika Singla
Associate Professor
Department of Neurology
DMCH, Ludhiana

Dr. Jatinder Singh Goraya
Professor
Department of Paediatrics
DMCH, Ludhiana

Date:

ENDORSEMENT BY THE HEAD OF THE INSTITUTE

This is to certify that the thesis entitled **"RISK FACTORS FOR MIGRAINE IN PEOPLE WITH EPILEPSY"** is a bonafide research work done by **Dr. Saurabh Sultania** under the supervision of **Dr. Gagandeep Singh,** Professor & Head, Department of Neurology, **Dr. Monika Singla**, Associate Professor, Department of Neurology, & **Dr. Jatinder Singh Goraya,** Professor, Department of Paediatrics, in this institution.

Principal

Dr. Sandeep Puri
Principal
DMC&H, Ludhiana

Date:

COPYRIGHT

Declaration by the Candidate

I hereby declare that the Baba Farid University of Heath Sciences, Faridkot, shall have the rights to preserve & use this thesis in print or electronic format for academic/study purpose by the research scholar/students.

Signature

Dr. Saurabh Sultania
Department of Neurology
Dayanand Medical College & Hospital,
Ludhiana, Punjab

Date:

© Baba Farid University of Health Sciences, Faridkot

Dedicated

to

my family, friends

&

Teachers

LIST OF ABBREVIATIONS

ASM	-	Anti-seizure medication
BMI	-	Body Mass Index
CGRP	-	Calcitonin Gene related peptide
CSD	-	Corical spreading depression
FHM	-	Familial hemiplegic migraine
MRI	-	Magnetic resonance imaging
NMDA	-	N-methyl-D-aspartate
SD	-	Spreading depression
PWE	-	People with epilepsy

ABSTRACT

Introduction: Epilepsy and headache are common neurological problems seen in neurological practice. It has been observed that in comparison with people without epilepsy, patients with epilepsy harbored 52% increased migraine prevalence. It is presently unclear that what are the risk factors for migraine in people with epilepsy. So, the present study was conducted to know what are the risk factors for migraine in people with epilepsy.

Aim of Study: To determine the risk factors for migraine in people with new-onset epilepsy.

Material & Methods: This study was conducted in the new onset epilepsy patients, attending neurology OPD. Patients with idiopathic generalized and focal epilepsy who were on monotherapy of Anti Seizure medications (ASMs) were included. They were followed every month for 3 months for the presence/ absence of migraine.

Results: The majority of patients were male (53.8%), and the most common seizure type observed was bilateral tonic-clonic seizures. Out of the 52 patients, 9 were found to have migraine. Although migraine appeared to be more common in females, unmarried individuals, and the age group of 11-20 years, these differences were not statistically significant. Various ASM's were prescribed, with levetiracetam being the most commonly used. While there was a slightly higher frequency of migraines among patients on levetiracetam, this difference was not statistically significant.

Conclusion: Migraine is an important comorbidity in epilepsy. Recognition of migraine and its risk factors is important. Patients with epilepsy who are having migraine or are at increased risk of migraine can be treated with ASM having anti migranous properties. It may help in preventing the attacks of migraine thereby reducing the morbidity in people with epilepsy. We tried to find the risk factors for migraine in people with epilepsy by studying the association of various factors such as age, sex, BMI, employment status, marital status, antiseizure medication etc. with migraine. No significant association was found in our study with any of the above factors. Larger studies with longer follow-up periods are necessary to gain a more comprehensive understanding of the risk factors for migraine in patients with epilepsy.

Key words: Migraine, epilepsy, Antiseizure medications.

ACKNOWLEDGEMENT

I am highly grateful to the Almighty without whose blessings no work can be conceived, much less completed. His presence we feel at each and every step of life. He's the one who holds our hand and guides us through everything.

I take this opportunity to thank all those who have been helping me in the successful completion of this work.

With a deep sense of gratitude, I wish to convey my thanks to my esteemed teacher and supervisor ***Dr. Gagandeep Singh****, Professor and Head, Department of Neurology, DMC&H, Ludhiana who has been most helpful and supportive throughout my tenure. His able and mature guidance and ever-willing help made the assigned task simpler. He has always been the epitome of excellence for me.*

It is with great reverence and profound pleasure that I acknowledge the valuable suggestions, scholarly guidance and constant encouragement rendered by my co-supervisors ***Dr. Monika Singla****, Professor, Department of Neurology, DMC&H, Ludhiana and Dr.* ***J.S. Goraya****, Professor, Department of Paediatrics, DMC&H, Ludhiana. An opportunity to learn from them has been one of the special things that this work provided. I am really indebted to them for being supportive throughout. I take great pride in expressing my gratitude towards them.*

Words are woefully inadequate to express my sense of gratitude tomy parents, Mr. B.P. Sultania & Mrs. Savita Sultania, for their love, selfless sacrifices, unfailing

attention to my needs and blessings that have made me whatever I am today.

I would like to express my thanks towards my wife - Dr. Meghna Sultania whose constant support helped me get through this hefty task. No amount of words is sufficient to thank her for her unparalleled care, love and support.

No words are enough to thank, my daughter Mishka Sultania whose smile and laughter always helped me during my hard times.

My thanks to colleagues & friends Dr. Rajat Gupta, And my seniors Dr. Parth Bansal, Dr. Balveen Singh, Dr. Nitika Mahajan, Dr. Venkatesh Sajja, my juniors Dr. Iqbal Singh, Dr. Abhinav Mohindra, Dr. Japleen Kaur for their brilliant company in this journey. They have been invaluable support day in, day out for the entire course of work.

I am thankful to the EEG technicians Mr. Arun Khokhar, Mr. Kuldeep Singh Manral, Mrs. Priya Mishra who helped me to conduct this study.

Thanks to all the patients who have been a part of this study and DMCH staff & residents who made this uphill task possible.

A Special Thanks to Mr. Gurjot Singh, Mr. Naveen Bhatia, Mrs. Namita Bansal, Mr. Sushil, Mr. Dharampal Singh, Miss Prachi, Miss Swati, Miss Srishti, Research & Development centre for their efforts.

Dr. Saurabh Sultania

TABLE OF CONTENTS

S.NO.	TOPIC	PAGES
I	INTRODUCTION	1-6
II	AIMS AND OBJECTIVES	7
III	REVIEW OF LITERATURE	8-23
IV	MATERIALS AND METHODS	24-25
V	OBSERVATIONS AND RESULTS	26-67
VI	DISCUSSION	68-71
VII	SUMMARY AND CONCLUSIONS	72-73
VIII	BIBLIOGRAPHY	74-79

APPENDICES–I

- PROFORMA
- MASTER CHART

APPENDICES–II

- APPROVAL LETTER OF THESIS PLAN
- THESIS PLAN

LIST OF TABLES

TABLE NO.	TITLE	PAGE NO.
(i)	SYMPTOMS COMMON TO BOTH MIGRAINE AND EPILEPSY	3
1	AGE-WISE DISTRIBUTION OF PATIENTS	26
2	SEX-WISE DISTRIBUTION OF PATIENTS	28
3	DISTRIBUTION OF PATIENTS ACCORDING TO THEIR MARITAL STATUS	29
4	DISTRIBUTION OF PATIENTS ACCORDING TO THEIR EMPLOYMENT STATUS	30
5	DISTRIBUTION OF PATIENTS ACCORDING TO THEIR SOCIOECONOMIC STATUS	31
6	DISTRIBUTION OF PATIENTS ACCORDING TO SEIZURE TYPE	32
7	DISTRIBUTION OF PATIENTS ACCORDING TO HISTORY OF MIGRAINE	33
8	DISTRIBUTION OF PATIENTS ACCORDING TO TRIGGERING FACTORS	35
9	DISTRIBUTION OF PATIENTS ACCORDING TO FAMILY HISTORY	36
10	DISTRIBUTION OF PATIENTS ACCORDING TO BMI	37
11	DISTRIBUTION OF PATIENTS ACCORDING TO ANTI SEIZURE MEDICATIONS	38
12	DISTRIBUTION OF PATIENTS ACCORDING TO ANTI SEIZURE MEDICATIONS RELATED ADVERSE EFFECTS	40
13	DISTRIBUTION OF PATIENTS ACCORDING TO PRESENCE/ABSENCE OF MIGRAINE	42
14	DISTRIBUTION OF PATIENTS ACCORDING TO TOTAL EPISODES OF MIGRAINE	43
15	CHARACTERISTICS OF STUDY PARTICIPANTS	45
16	COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S AGE	46
17	COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S GENDER	48
18	COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S OCCUPATIONAL STATUS	49
19	COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S SEIZURE TYPE	51
20	COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S PRESCRIBED ANTI SEIZURE MEDICATIONS	53
21	COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S MARITAL STATUS	55
22	COMPARISON OF MIGRAINE ACCORDING TO	56

	PATIENT'S SOCIOECONOMIC STATUS	
23	COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S BMI	58
24	COMPARISON OF MIGRAINE ACCORDING TO MEAN AGE OF PATIENTS	60
25	COMPARISON OF MIGRAINE ACCORDING TO MEAN BMI OF PATIENTS	61
26	COMPARISON OF MIGRAINE ACCORDING TO MEAN DOSE OF LEVETIRACETAM	64
27	COMPARISON OF MIGRAINE ACCORDING TO MEAN DOSE OF VALPROATE	66

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE NO.
1	AGE-WISE DISTRIBUTION OF PATIENTS	27
2	SEX-WISE DISTRIBUTION OF PATIENTS	28
3	DISTRIBUTION OF PATIENTS ACCORDING TO THEIR MARITAL STATUS	29
4	DISTRIBUTION OF PATIENTS ACCORDING TO THEIR EMPLOYMENT STATUS	30
5	DISTRIBUTION OF PATIENTS ACCORDING TO THEIR SOCIOECONOMIC STATUS	31
6	DISTRIBUTION OF PATIENTS ACCORDING TO SEIZURE TYPE	32
7	DISTRIBUTION OF PATIENTS ACCORDING TO HISTORY OF MIGRAINE	33
8	DISTRIBUTION OF PATIENTS ACCORDING TO TRIGGERING FACTORS	35
9	DISTRIBUTION OF PATIENTS ACCORDING TO FAMILY HISTORY	36
10	DISTRIBUTION OF PATIENTS ACCORDING TO BMI	37
11	DISTRIBUTION OF PATIENTS ACCORDING TO ANTI SEIZURE MEDICATIONS USED	39
12	DISTRIBUTION OF PATIENTS ACCORDING TO ANTI SEIZURE MEDICATIONS RELATED ADVERSE EFFECTS	41
13	DISTRIBUTION OF PATIENTS ACCORDING TO PRESENCE/ABSENCE OF MIGRAINE	42
14	DISTRIBUTION OF PATIENTS ACCORDING TO TOTAL EPISODES OF MIGRAINE	44
15	CHARACTERISTICS OF STUDY PARTICIPANTS	45
16	COMPARISON OF MIGRAINE ACCORDING TO PATIENT’S AGE	47
17	COMPARISON OF MIGRAINE ACCORDING TO PATIENT’S GENDER	48
18	COMPARISON OF MIGRAINE ACCORDING TO PATIENT’S OCCUPATIONAL STATUS	50
19	COMPARISON OF MIGRAINE ACCORDING TO PATIENT’S SEIZURE TYPE	52
20	COMPARISON OF MIGRAINE ACCORDING TO PATIENT’S PRESCRIBED ANTI SEIZURE MEDICATIONS.	54
21	COMPARISON OF MIGRAINE ACCORDING TO PATIENT’S MARITAL STATUS	55
22	COMPARISON OF MIGRAINE ACCORDING TO PATIENT’S SOCIOECONOMIC STATUS	57
23	COMPARISON OF MIGRAINE ACCORDING TO	59

	PATIENT'S BMI	
24	COMPARISON OF MIGRAINE ACCORDING TO MEAN AGE OF PATIENTS	60
25	COMPARISON OF MIGRAINE ACCORDING TO MEAN BMI OF PATIENTS	62
26	COMPARISON OF MIGRAINE ACCORDING TO MEAN DOSE OF LEVETIRACETAM	65
27	COMPARISON OF MIGRAINE ACCORDING TO MEAN DOSE OF VALPROATE	67

KEY TO MASTER CHART

Y	-	Yes
N	-	No
M	-	Male
F	-	Female
B/L Tonic Clonic	-	Bilateral Tonic Clonic
BD	-	Twice Daily
TDS	-	Thrice Daily

INTRODUCTION

The history of epilepsy dates back to antiquity. The earliest description of epilepsy can be found in the Sumerian documents dated ~ 2500 BC. In the text, a condition called anta'subbu (English: the hand of sin) is described, which affects unclean and infectious-looking people. The patients were ''unconscious with neck turned, arms/legs tense, eyes open and froth around the mouth."[1]

Currently, epilepsy is defined as per ILAE definition 2014, as a disease of the brain with (1) at least two unprovoked (or reflex) seizures occurring greater than 24 hours apart, or (2) one unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over the next 10 years, or (3) diagnosis of an epilepsy syndrome.[2]

As per WHO, around 50 million people worldwide have epilepsy and nearly 80% of them live in low- and middle-income countries. In a recent meta-analysis, the pooled prevalence of epilepsy in India was found to be 4.7 per 1,000 population.[3,4]

The term migraine derives from the ancient Greek word hemikranios, which means "half head". Migraine is a primary headache disorder. It is a common disabling condition. In the Global Burden of Disease Study 2010 (GBD2010), it was ranked as the third most prevalent disorder in the world. In GBD2015, it was ranked third–highest cause of disability worldwide in both males and females under the age of 50 years.[5,6]

Migraine is usually associated with triggers. A trigger is any factor that on exposure or withdrawal leads to the development of an acute migraine headache. Around 75 % of patients with migraine can identify triggers. Commonly identified triggers are emotional stress, fluctuating female

hormones, missed meals, weather factors, sleep disturbances, odours, certain visual stimuli, alcohol, muscle tension, physical exercise, etc.[7,8]

Epilepsy and headache are common neurological problems seen in neurological practice. Headache prevalence in people with epilepsy (PWE) has been estimated between 7% and 57% across different studies, and the majority of these headaches were reported as migraine.[9,10,11]

The headache in epilepsy is categorized as preictal, ictal, postictal, or interictal. Preictal headache is defined as a headache starting not more than 24 h before the seizure and lasting until the onset of a seizure. Ictal headache is defined as a headache occurring during a simple partial epileptic seizure, and postictal headache as a headache starting within three hours after a seizure and ceasing within 72 h after the attack. Interictal headache is defined as a headache starting not earlier than three hours after a seizure, or a headache never proceeding directly into an epileptic fit.[12]

The relationship between migraine and epilepsy is yet to be resolved.[13] Sir William Richard Gowers first proposed the hypothesis that headaches and epilepsy are related. He suggested that these two disorders share many pathophysiological mechanisms.[14]

Convergent studies have supported the existence of true comorbidity between epilepsy and migraine, meaning that the association of the two conditions exceeds in frequency what chance would predict. This finding is suggestive of a closer link between them, as illustrated by the fact that several anti seizure medications(ASM's) are successful in treating migraine. The relationship between epilepsy and migraine is also strengthened by the fact that the two disorders share many common symptoms and also many neurological disorders like Familial hemiplegic migraine, and Rolandic epilepsy have both migraine and epilepsy.[12,15]

Table (i) - Symptoms common to both migraine and epilepsy[16]

Symptom	Migraine	Epilepsy
Systemic		
Vomiting	+	±
Nausea	+	±
Diarrhea	±	-
Headache	+	±
Visual disturbances		
Coloured circles	-	+
Black and white lines	+	-
Blindness	±	±
Blurred vision	+	+
Visual triggering factors	+	+
Other neurologic		
Olfactory	±	+
Vertigo	+	±

Confusion	±	+
Loss of consciousness	±	+
Impaired consciousness	±	+
Loss of memory	±	+
Post event lethargy	+	+
Depersonalization	±	+
Paresthesias	+	+
Hemiparesis	±	+
Hemisensory loss	±	+
Aphasia	±	+

+ denotes presence; - denotes absence

Syndromes having both migraine and epilepsy in common.

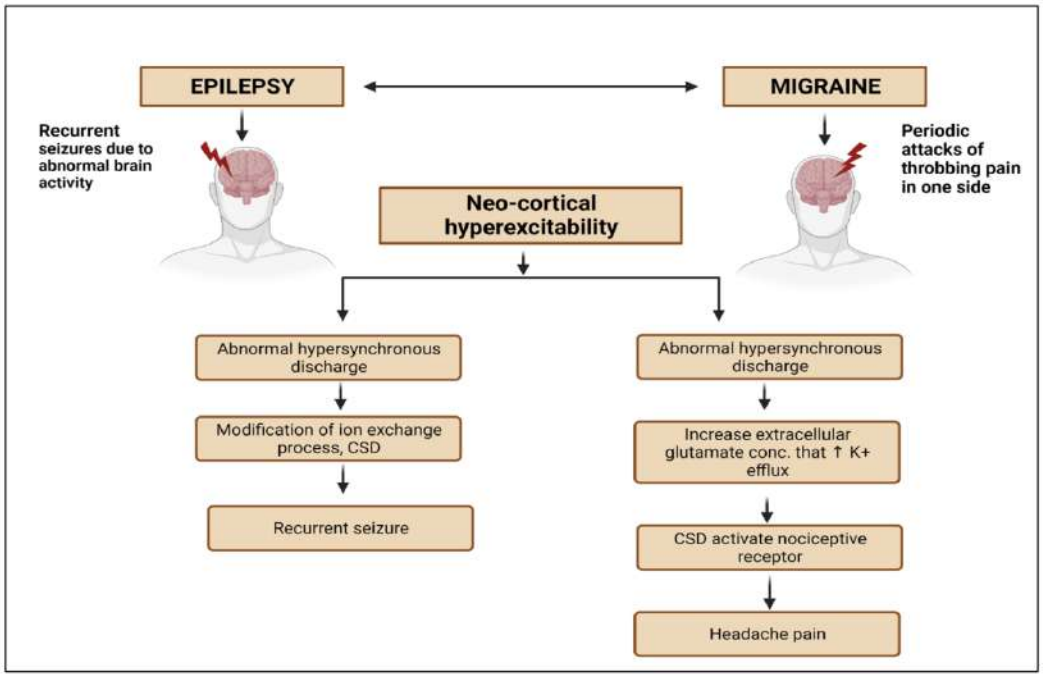
Familial hemiplegic migraine type 1 is due to a mutation in the CACNA1 gene, common clinical features are migraine with typical aura and motor weakness. Absence seizures may also be seen. Familial hemiplegic migraine type 2 is due to a mutation in the ATP1A2 gene, along with migraine, 20 % of patients may have epilepsy also. Similarly, Familial hemiplegic migraine type 3 is due to a mutation in the SCN1A gene. Epilepsy syndromes like GEFS PLUS and Dravet syndrome are linked to mutations in the SCN1A gene.[15]

Thus, the comorbidity between migraine and epilepsy can be explained by the presence of a common causal factor, for example genetic, or by the sharing of a specific pathophysiology.[12]

Cortical spreading depression is thought to be the link between migraine and epilepsy.[17]

CSD is characterized by a slowly propagating wave (2–6 mm/min) of sustained strong neuronal depolarization that generates transient intense spike activity as it progresses into the brain tissue (resulting in a transient loss of membrane ionic gradients and a massive surge of extracellular potassium, neurotransmitters, and intracellular calcium), followed by neural suppression which may last for minutes. The depolarization phase is associated with an increase in regional cerebral blood flow, whereas the phase of reduced neural activity is associated with a reduction in blood flow. it is, however, believed to cause the activation of the Trigemino-vascular system, consisting of the cascade release of numerous inflammatory molecules and neurotransmitters, which results in pain during the migraine attack.[17]

Similarly in epilepsy Spreading depression may create an environment conducive to the onset of epileptiform activity. Both mouse and human experiments have shown states of hyperexcitability following a cortical depression period, similar to that seen before the onset of epileptic seizures. An explanation for this may be related to the neuronal swelling that occurs following SD waves, which may increase neuronal excitability through the activation of NMDA receptor-dependent inward currents.[18]



[19]

While the prevalence of migraine and other headaches in epilepsy has been extensively studied, very few studies have focussed on identifying risk factors for migraine in people with epilepsy.

Knowledge of risk factors that might lead to or aggravate an attack of migraine, particularly preventable factors, would help prevent attacks of migraine. Also, this may influence the choice of ASM's. Considering this background information, the current study had been conducted at a Tertiary Care centre of Ludhiana to identify risk factors for migraine in people with epilepsy.

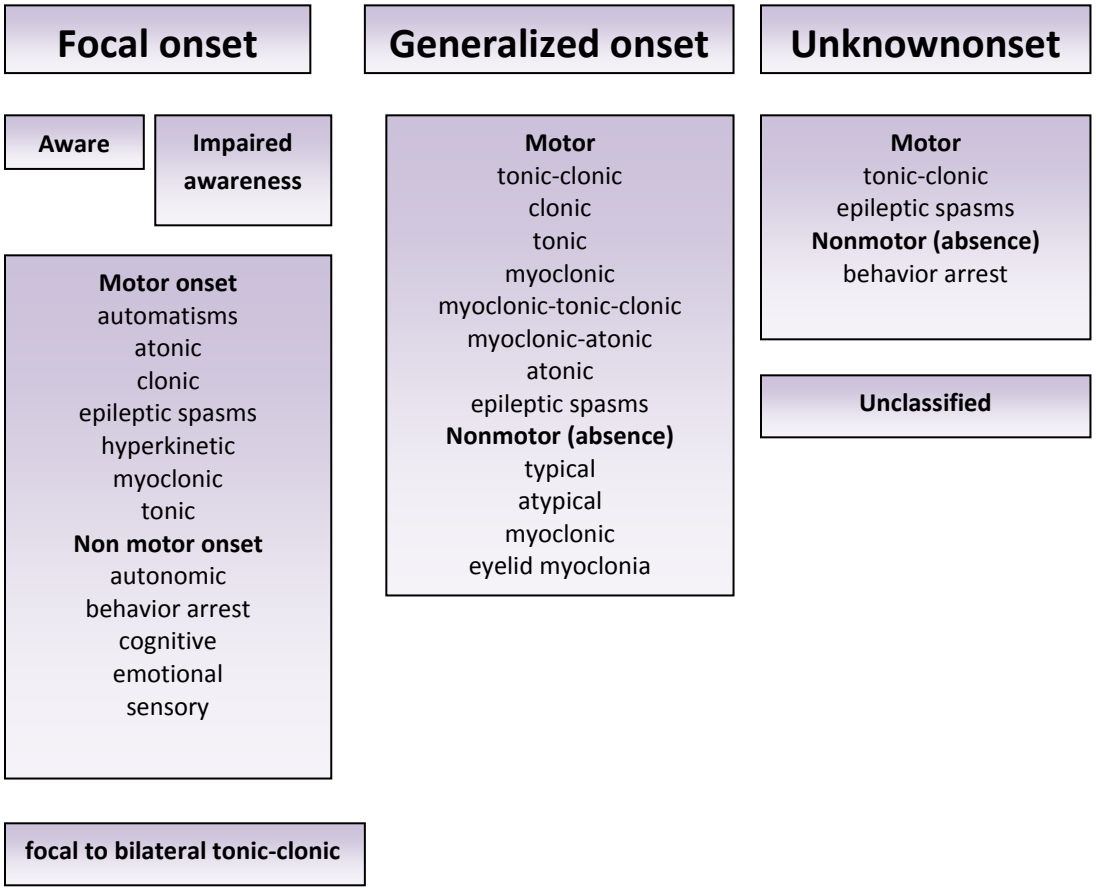
AIMS AND OBJECTIVES

To determine the risk factors for migraine in people with new-onset epilepsy.

REVIEW OF LITERATURE

Seizures are transient events that include symptoms and/or signs of abnormal excessive hypersynchronous activity in the brain. Currently, seizures are classified as per ILAE 2017 classification.

Figure (i)



ILAE defines epilepsy as, a disease of the brain with

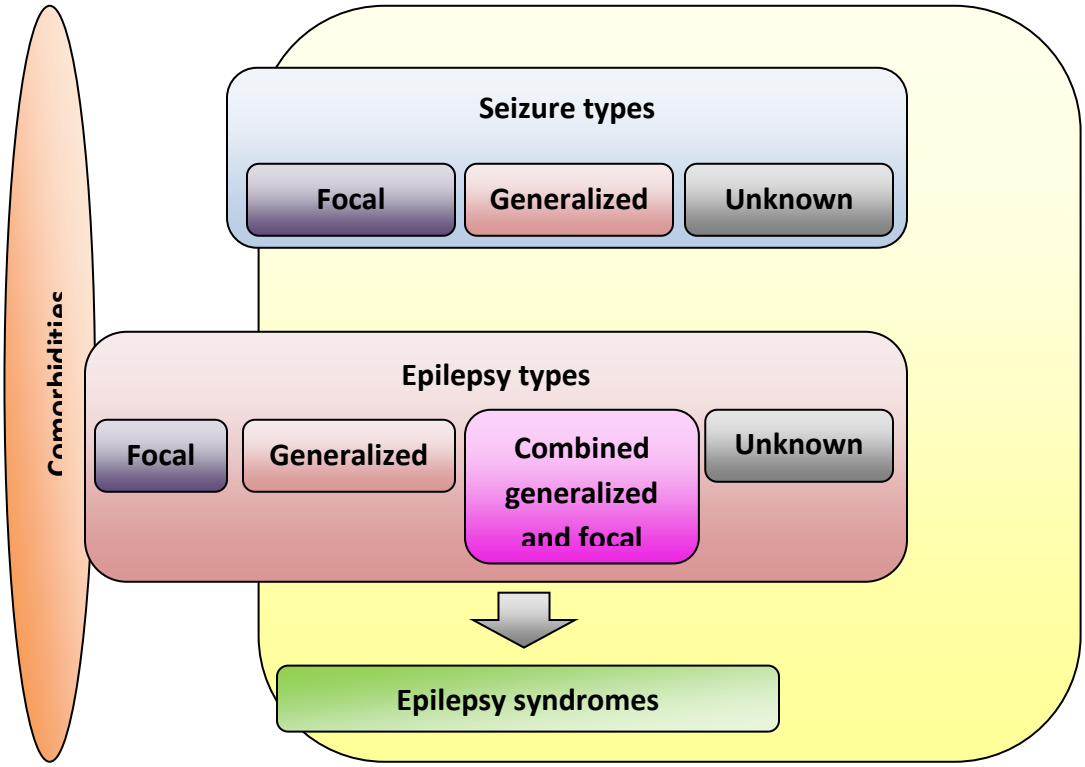
(1) At least two unprovoked (or reflex) seizures occurring greater than 24 hours apart, or

(2) One unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over the next 10 years, or

(3) diagnosis of an epilepsy syndrome.

ILAE CLASSIFIES EPILEPSY AS

Figure (ii)



[20]

Migraine is a primary headache disorder, it is an important cause of years lived with chronic disability. Migraine is defined and classified as per the ICHD-3 criteria.

1. Migraine

1.1 Migraine without aura

1.2 Migraine with aura

1.2.1 Migraine with typical aura

1.2.1.1 Typical aura with headache

1.2.1.2 Typical aura without headache

1.2.2 Migraine with brainstem aura

1.2.3 Hemiplegic migraine

1.2.3.1 Familial hemiplegic migraine (FHM)

1.2.3.1.1 Familial hemiplegic migraine type 1 (FHM1)

1.2.3.1.2 Familial hemiplegic migraine type 2 (FHM2)

1.2.3.1.3 Familial hemiplegic migraine type 3 (FHM3)

1.2.3.1.4 Familial hemiplegic migraine, other loci

1.2.3.2 Sporadic hemiplegic migraine (SHM)

1.2.4 Retinal migraine

1.3 Chronic migraine

1.4 Complications of migraine

1.4.1 Status migrainosus

1.4.2 Persistent aura without infarction

1.4.3 Migrainous infarction

1.4.4 Migraine aura-triggered seizure

1.5 Probable migraine

1.5.1 Probable migraine without aura

1.5.2 Probable migraine with aura

1.6 Episodic syndromes that may be associated with migraine

1.6.1 Recurrent gastrointestinal disturbance

1.6.1.1 Cyclical vomiting syndrome

1.6.1.2 Abdominal migraine

1.6.2 Benign paroxysmal vertigo

1.6.3 Benign paroxysmal torticollis [21]

Two main types of migraine are migraine without aura and migraine with aura.

ICHD-3 DIAGNOSTIC CRITERIA for migraine without aura

A. At least five attacks fulfilling criteria B-D

B. Headache attacks lasting 4–72 h (untreated or unsuccessfully treated)

C. Headache has at least two of the following four characteristics:

a. Unilateral location

b. Pulsating quality

c. Moderate or severe pain intensity

d. Aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)

D. During headache at least one of the following:

e. Nausea and/or vomiting

f. Photophobia and phonophobia

E. Not better accounted for by another ICHD-3 diagnosis

For diagnosing migraine with aura patient must have at least 2 attacks of migraine with aura.

ICHD-3 diagnostic criteria for migraine with aura.

A. At least two attacks fulfilling criteria B and C

B. One or more of the following fully reversible aura symptoms:

a. Visual

b. Sensory

c. Speech and/or language

d. Motor

e. Brainstem

f. Retinal

C. At least three of the following six characteristics:

g.at least one aura symptom spreads gradually over ≥ 5 minutes

h. two or more aura symptoms occur in succession

i. each individual aura symptom lasts 5–60 minutes

j.at least one aura symptom is unilateral

k.at least one aura symptom is positive

l. the aura is accompanied, or followed within 60 minutes, by headache

D. Not better accounted for by another ICHD-3 diagnosis.[22]

Sir William Gowers was amongst the 1st neurologists to identify that migraine and epilepsy are related. He stated that migraine comes into the borderland of epilepsy and the two are related in many ways.[23]

In 1960, Lennox and Lennox reported a case of seizure which was preceded by headache along with nausea and vomiting. They coined the term migralepsy to refer to seizures following a migraine attack.[24]

Migraine and epilepsy share many common features such as both are paroxysmal neurological disorders, both may be preceded by an aura and both may have prodromal features, both may have genetic predispositions also. The association between migraine and epilepsy is also strengthened by the fact that many anti seizure medications are effective in treating migraine also.[25]

The link between migraine and epilepsy

The term “spreading depression” or cortical spreading depression implies slowly propagating changes in neuronal electrical potentials, which coincide with or lead to silencing electrical activity of the brain. It is a self-propagating phenomenon, and it propagates as a wave along the gray matter of the brain through contiguity.

Mechanisms of cortical spreading depression

Na/K/Cl $^{-}$ are the main ions involved in neuronal signaling. The difference in the intracellular and extracellular concentrations of these ions form the ionic gradients. These ion gradients are the reservoirs of electrochemical energy needed for neuronal signaling. When action potential is generated, these ions move across the cell membrane. Na/K/ATPase pump restores ion homeostasis and helps in maintaining ionic gradients across the cell membrane.

Role of glial cells

Glial cells buffer the K+ ions in the extracellular space and also absorb the glutamate released from the excitotoxic synapse. This helps in preventing excitotoxicity reactions. When the concentration of K+ and glutamate exceeds the absorption threshold of glial cells, there is a massive accumulation of these ions in the extracellular milieu. This results in large depolarizations which leads to loss of membrane resistance and large shifts in the intracellular and extracellular ion concentration preventing the generation of an action potential.

At the beginning of action potential, there is an opening of sodium channels which leads to a rapid rise in the membrane potential. Conversely, during spreading depression there is a change in the concentration of the extracellular and intracellular ions which leads to gradual modification in the resting membrane potential which leads to slow temporal evolution of depolarization. This slow temporal evolution of depolarization is typical of spreading depression.

Role of potassium

Extracellular potassium ions play an important role in triggering the spreading depression. Under normal physiologic conditions, extracellular K+ concentration is low, however, it can increase through transmembrane fluxes. To maintain electroneutrality between the two sides, there is an influx of Na/K/Ca ions from the extracellular space mediated by the Na/Calcium/ATPase pump.

During SD, the passive cation influx exceeds the capacity of the Na/Ca/ATPase pump resulting in the breakdown of ion homeostasis.

Synaptic failure and reduction of local electrical activity.

During spreading depression there is increased ATP consumption. adenosine is the breakdown product of ATP, so increased ATP consumption leads to a high extracellular concentration of adenosine. Adenosine, in turn, prevents the release of Glutamate which is an excitatory neurotransmitter. So, this leads to a reduction in local electrical activity. Even after repolarization, electrical activity remains suppressed for some time and neurons are unresponsive to the application of glutamate.

Morphological changes in neurons.

The main changes seen in neurons during the spreading depression are

1. There is swelling of neurons along with beading and loss of many dendritic spines. Cellular swelling appears to occur through the release of GABA, which may facilitate chloride entry and cause cellular swelling.

2. Due to changes in the concentration of ions, there is a water influx. This leads to a decrease in ECF volume and increases neuronal osmolality.

Propagation of spreading depression

The depolarization wave follows the all-or-none phenomenon. It propagates through the gray matter at the speed of 2-6 mm/ min. The exact mechanism of propagation is poorly understood. Proposed mechanisms suggest the role of extracellular potassium or glutamate or the opening of the neuronal/ glial gap junctions.

Tissue recovery

Under normal conditions, electrical activity returns to normal after a few minutes. This is mediated by:

1. Activation of Na/K/ATPase pump due to increased intracellular sodium and extracellular potassium.

2. Repolarization closes the voltage-gated potassium channels, thereby decreasing potassium efflux.

3. Glial cells buffer the extracellular potassium and thereby promote repolarization.

Vascular response to spreading depression

Spreading depression involves a complex interplay between neurons, glia, and blood vessels.

Normally in healthy tissues, increased electrical activity is coupled with the release of vasodilators such as nitric oxide. This increases the local blood flow to meet the raised energy requirements. During spreading depression, this response occurs in a non-linear fashion such that a moderate increase in extracellular potassium cause vasodilation, whereas a large increase in potassium concentrations induces vasoconstriction.

Other factors influencing spreading depression.

1. Gene mutations studies done in hemiplegic migraine have suggested that genetic mutation can decrease the threshold for spreading depression.

2. Genetically modified mice having inactivation of CX43 showed an increased susceptibility to spreading depression.

3. Rodent models have suggested that females may have a slightly lower threshold for spreading depression than males. This is thought to be mediated by estrogen which may lead to down regulation of KCC2 in certain brain areas leading to less effective inhibition.

Role of cortical spreading depression (CSD) in migraine

Two major types of migraine are migraine with aura and migraine without aura. Spreading depression (SD) is more closely related to migraine with Aura, and cortical SD is thought to be the main mechanism behind migraine aura.

Progression of migraine aura shows the typical features of experimentally induced SD in animals. Moreover, alterations in cortical activity and blood flow show spreading depression-like features. It has been hypothesized that drastic depolarization occurring during spreading depression releases noxious molecules and ions such as H+ and K+ in the extracellular space. The rise in extracellular potassium during spreading depression leads to the excitation of nociceptive fibers in the V1 division of the trigeminal nerve, enveloping pial vessels. The meningeal afferents release pro inflammatory peptides such as CGRP and substance P that induce vasodilation which in turn leads to extravasation of plasma proteins thereby triggering the headache.

Role of cortical spreading depression in epilepsy

Excitotoxic states are a common feature of both seizures and cortical spreading depression. Seizures have been seen before, during, and after spreading depression. Also, its been hypothesized that seizures produce an environment which is conducive to cortical spreading depression. Experimental studies on hippocampal slices of epileptic patients have shown that neurons appear to be primed for Cortical spreading depression

and the addition of extracellular potassium to the microenvironment can trigger cortical spreading depression.

Vice versa cortical spreading depression may lead to epileptiform activity. In rats, it was seen that the presence of cortical spreading depression created a state of hyperexcitability identical to that seen prior to the onset of seizures. Also, after cortical depression, there is a state of neuronal hyperexcitability that may prim them for epileptiform activity.

After the generation of spreading depression, increased expression of NMDA, AMPA, and kainate binding sites is seen in rat hippocampus, which may lower the threshold for epileptiform activity.[26-28]

Role of genetics in pathophysiology of migraine and epilepsy

it is well known that both migraine and epilepsy have genetic predisposition. Familial hemiplegic migraine (FHM) is and autosomal dominant condition. In FHM, mutations are seen in CACNA1(FHM 1), ATP1A2(FHM 2), SCN1A(FHM 3) genes. These genes they are involved in the functioning of neuronal ion channels. Mutations in these genes can cause ion channel dysfunction, which can lead to abnormal changes in neuronal ion concentration, thereby altering the cortical hyperexcitability. Mutations in CACNA1 gene can cause FHM, epilepsy, episodic ataxia. CACNA1 gene encodes for the alpha subunit of voltage-gated calcium channel, a mutation in this gene alters the associated inhibitory G protein and then leads to decreased inhibition which can cause neurons to become hyperexcitable. SNCA1 gene causes Dravet syndrome (severe myoclonic epilepsy), FHM-3. SCNA1 gene is responsible for the formation of alpha subunit of sodium channel(Nav1.1). Mutations in the SCNA1 gene lead to impaired sodium channel function which leads to reduced sodium current in inhibitory GABA interneuron which may lead to electrical network hyperexcitability.

Mutations in the PRRT2 gene have been associated with benign familial infantile seizures and infantile convulsions choreoathetosis syndrome. PRRT2 mutations are also hypothesized to be involved in the normal/ hemiplegic migraine. PRRT2 encodes a protein that modulates the synaptic neurotransmitter release leading to dysregulated neuronal excitability which may lead to paroxysmal movement disorders and seizures.[25]

Whealy et al assessed the frequency and characteristics of interictal and postictal headaches in epilepsy patients admitted to the mayo clinic Rochester epilepsy center. They found that out of 128 patients, interictal headache was reported in 97 patients. Definite migraine was present in 22/97 (18 %), and probable migraine was present in 26/97 (22%) of patients. They also found that there was no difference in males and females reporting interictal migraine.[9]

Jasim et al studied the relationship between epilepsy and migraine in 125 patients visiting the neurology department at Tikrit hospital. Patients had either generalized or focal epilepsy. Migraine was identified in 24 out of 125 epileptic patients. Out of 24 patients with migraine 17 were females and 7 were males. The most common affected group was 35 – 54 years. The most common precipitating factor for migraine was physical activity seen in 19/ 24 patients(79%), followed by psychological stress, in 17/24(70 %). Migraine was more common in patients with partial epilepsy 18/24 patients (75 %). 11/ 24 patients who had migraine were on carbamazepine, and 6/24 were on sodium valproate.[29]

Chovatiya et al evaluated 203 patients with epilepsy visiting the epilepsy clinic at Parmukshswami medical college Gujarat. All patients were > 18 years of age. the prevalence of headaches in PWE was 45% (92 out of 203 PWE). Among these 92 patients with headaches, migraine was the most prevalent form, accounting for 71% (n = 65), followed by TTH (23%;

n = 21). Both, migraine and TTH in PWE were more prevalent in females as compared to males. Female gender and younger age significantly correlated with migraine.[30]

Atalar et al investigated the prevalence of headaches in patients with idiopathic/ genetic epilepsy. Among all the patients, 508 (62.8%) reported having headache. The prevalence of interictal headache (IIH) was found to be 54.88% (444/809). The most frequent type of IH was migraine, with a prevalence of 41.2% (migraine with aura [MwA], 16.06%; migraine without aura [MwoA]. When we evaluated the adult and children/adolescent groups separately, the prevalence of migraine in the adult group was 44.6% whereas it was 24.8%for the child/adolescent group. [31]

In a systematic review conducted by Amiri et al, they proposed that due to the complex nature of migraine, it is difficult to differentiate between migraine triggers, risk factors, and outcomes. The risk factors for migraine development and progression are as depicted in the table below:

Biological factors	Hormonal imbalances	Estrogen dysregualtion Cortisol dysregulation
	Demographic factors	Advancing age Female sex
	Metabolic factors	Obesity Dyslipidaemia Diabetes

		Hypertension
	Genetic and epigenetic factors	MTDH gene MEF2D gene PRDM16 gene
Psychological factors	Psychological factors	Anxiety Phobia Panic Stress
Miscellaneous*	Miscellaneous*	Lower level of education Lower socioeconomic status

[32]

Lemos et al studied specific risk factors contributing to increased risk for migraine in 131 migraine Portuguese families. They found that gender is a risk factor for migraine, and female 1st-degree relatives are at a higher risk than males, while proband's gender and age of onset didn't confer any additional; risk for migraine.[33]

In a community-based study from eastern India, Das et al studied the prevalence, risk factors, and burden of migraine. They found that Slum dwelling, a poor income, lack of education, absence of family support (as commonly noticed in a nuclear family), and marital status were more associated with migraine.[34]

Eric et al conducted a cross-sectional study in Burkina Faso (west Africa). They found that female gender, high socioeconomic status, coffee, and alcohol consumption were significantly and positively associated with migraine, while profession and education were not. Considering cardiovascular risk factors, high blood pressure and smoking were positively associated with migraine. Variables such as diabetes, obesity, and physical inactivity were not found to be positively associated with migraine.[35]

Waldie et al studied risk factors for primary headaches in pre-adolescent children using data collected from Auckland Birth Weight Collaboration Study, they found that migraine was associated with both reduced sleep duration and problem behaviour.[36]

Schiller et al conducted a prospective study on people with epilepsy attending the seizure outpatient clinic at Innsbruck. The study included 500 sex-matched adults. Overall, out of 500 epilepsy patients, 163 (32.6%) patients reported headaches. Migraine was the most frequent type of headache found in 54(33.1%) patients. 41 patients had migraine without aura, and 13 patients had migraine with aura.[37]

Wang et al studied the association between headaches and epilepsy in adult epileptic patients who went to the outpatient clinic of the Epilepsy Center of PLA General Hospital. Overall, 60.1% of the patients (male: 57.2%; female: 63.8%) reported headaches. The age-weighted prevalence of interictal migraine was 11.7% (male 8.9%, female 15.3%). they concluded that the prevalence of headaches, including migraine, is higher in epileptic patients in China.[38]

Sarah et al studied the prevalence of migraine in pediatric epilepsy patients. They found that the prevalence of migraine in the pediatric epilepsy population was 25%, which is greater than reported for children without epilepsy (3% –23%). Migraine was more prevalent in children >10 years, children with benign epilepsy with centrotemporal spikes(BECTS)

and children with juvenile myoclonic epilepsy (JME). Migraine onset was more likely to have occurred after epilepsy was diagnosed but was not more prevalent in those with intractable epilepsy.[39]

Mirac et al studied the long-term efficacy, tolerability, and safety of levetiracetam monotherapy in children with epilepsy. They found that 6.66% of the patients developed a headache.[40]

Richen et al compared the long-term efficacy and tolerability of sodium valproate and carbamazepine in untreated recently diagnosed adults with generalized or partial seizures. They found that headaches occurred in 3.4% (6/174) patients in the valproate group, and 6.1% (11/178) patients in the carbamazepine group.[41]

Glauser et al studied the efficacy of topiramate monotherapy in newly diagnosed epilepsy in children and adolescents. They divided the eligible patients into 3 groups, pediatric subset, children, and adolescents. Groups were further subdivided into those receiving topiramate 50 mg/ day and 400 mg/day. They found that headache occurred in 21%(32/151) in pediatric subset, 20%(14/69) in children subset, 21.9%(18/82) in adolescent subset. They also concluded that headache was inversely related to the dose of topiramate.[42]

Beydoun et al studied the efficacy of oxcarbazepine monotherapy in patients with medically refractory epilepsy. A total of 87 patients were enrolled. 46 belonged to the 300 mg group, and 41 belonged to the 2400 mg group. They found that headache occurred in 8.7% of patients (4/46) in the 300 mg group and 21.9% (9/41) in the 2400 mg group.[43]

Gilliam et al studied the safety and efficacy of lamotrigine monotherapy for partial seizure in adults. patients were randomized to receive either valproate or lamotrigine. They found that 7% (3/43) developed headache in the lamotrigine group, and 14% (6/44) developed headache in the valproate group.[44]

MATERIAL AND METHODS

Study design

This cross-sectional observational study was conducted at the outdoor patient department, of the Department of Neurology, DMC&H, Ludhiana. All newly diagnosed patients with idiopathic generalized epilepsy and focal epilepsy presenting to Neurology OPD DMCH Ludhiana between August 2021 to April 2023 were enrolled for study after taking informed and written consent. Diagnosis of epilepsy was as per the ILAE definition as proposed by Fischer et al.[2]Idiopathic generalized and focal epilepsy was defined as per the criteria proposed by Scheffer et al.[45] All patients were screened for migraine. Migraine was diagnosed as per ICHD-3 criteria[22] Patient demographics along with clinical characteristics such as seizure semiology, type of migraine (severity, disability, frequency, and pattern) along with the complete details of the anti seizure medication(ASM) being used by the patient were recorded. A complete drug history was also recorded. All participants were started on monotherapy with ASM (as per the choice of neurologist). All participants were screened for migraine at the start of the study then monthly for 3 months once on the maintenance dose of ASM. They were asked to fill up headache calendar for 3 months, only migrainous headaches were included, tension-type headache days, and other types of headaches were excluded. The severity of the migraine was assessed using the HIT-6 score, in English and regional languages. Anxiety and depression were ruled out using the GAD-7 and NDDI-E scales respectively.

SOURCE OF DATA:

Any patient who presents to DMCH in the outpatient Neurology clinic meeting the inclusion and exclusion criteria.

Inclusion criteria

1. Age 7 years or above
2. Diagnosis of epilepsy
3. Gender- either
4. Idiopathic generalized epilepsy and focal epilepsy
5. Patient on Monotherapy of ASM on maintenance dose

Exclusion criteria

1. Non-consenting individuals
2. Patients on polydrug therapy
3. Patients with secondary causes of headache such as intracranial tumours, meningitis, head injury, stroke, acute metabolic cause, etc.
4. Patients with severe mental retardation
5. Patients with psychogenic, non-epileptic seizures
6. Concomitant anxiety and depression

STATISTICAL ANALYSIS

Data were described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. To determine whether the data were normally distributed, a Kolmogorov-Smirnov test was used. Comparison of quantitative variables between the study groups was done using Mann Whitney *U* test for independent samples for non-parametric data. For comparing categorical data, Chi square ($\chi 2$) test was performed and fisher exact test was used when the expected frequency is less than 5. A probability value (*p* value) less than 0.05 was considered statistically significant. All statistical calculations were done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

OBSERVATION AND RESULTS

The study was carried out on all the patients who presented to the Neurology outpatient clinic with new onset idiopathic generalized and focal epilepsy. Patients who were started on single ASM were enrolled for the study. The study was conducted from August 2021 to April 2023. During this period, 391 patients were screened, of which 52 (13.2%) were enrolled in the study. Those patients who did not fulfill the inclusion and exclusion criteria were excluded from the study.

Among the 52 patients enrolled in the study, the highest proportion, 28 (53.8%) belonged to the age group 11-20 years as represented in Table 1.

TABLE 1 - AGE-WISE DISTRIBUTION OF PATIENTS

Age group	**No. of cases**	**Percentage**
< 10	3	5.8%
11-20.0	28	53.8%
21-30	13	25.0%
> 30	8	15.4%
Total	52	100.0%

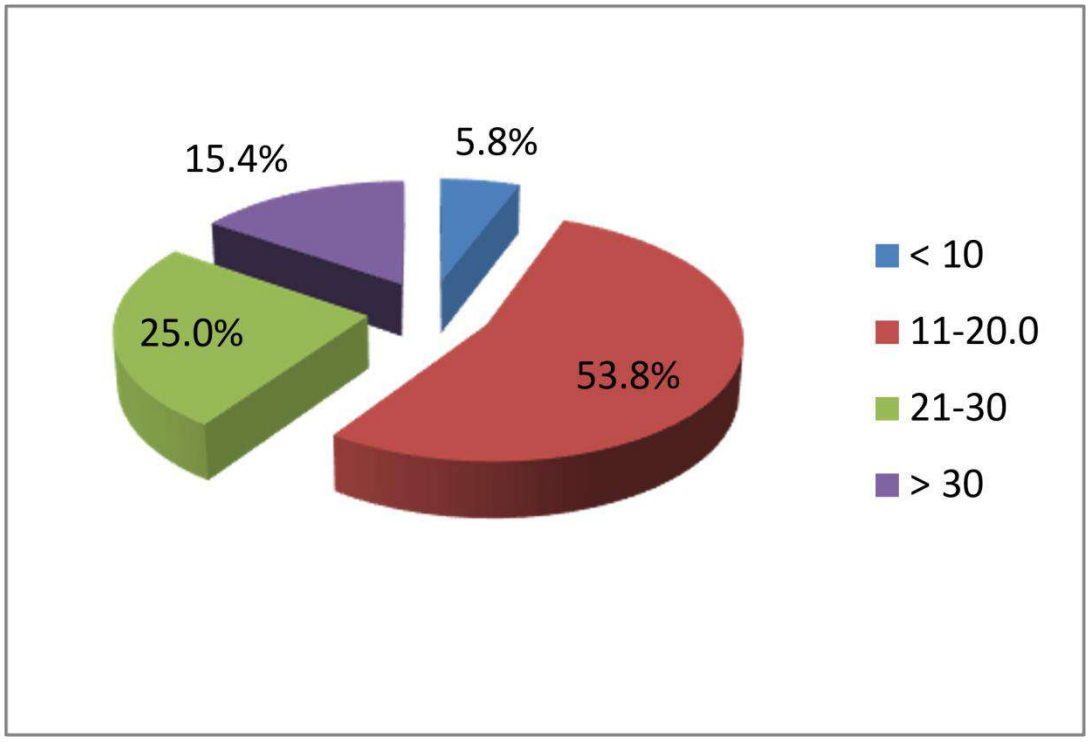


FIGURE 1 - AGE-WISE DISTRIBUTION OF PATIENTS

Most patients enrolled in the study were males, 28 (53.8%) as depicted in Table 2.

TABLE 2 - SEX-WISE DISTRIBUTION OF PATIENTS

Gender	No. of cases	Percentage
F	24	46.2%
M	28	53.8%
Total	52	100.0%

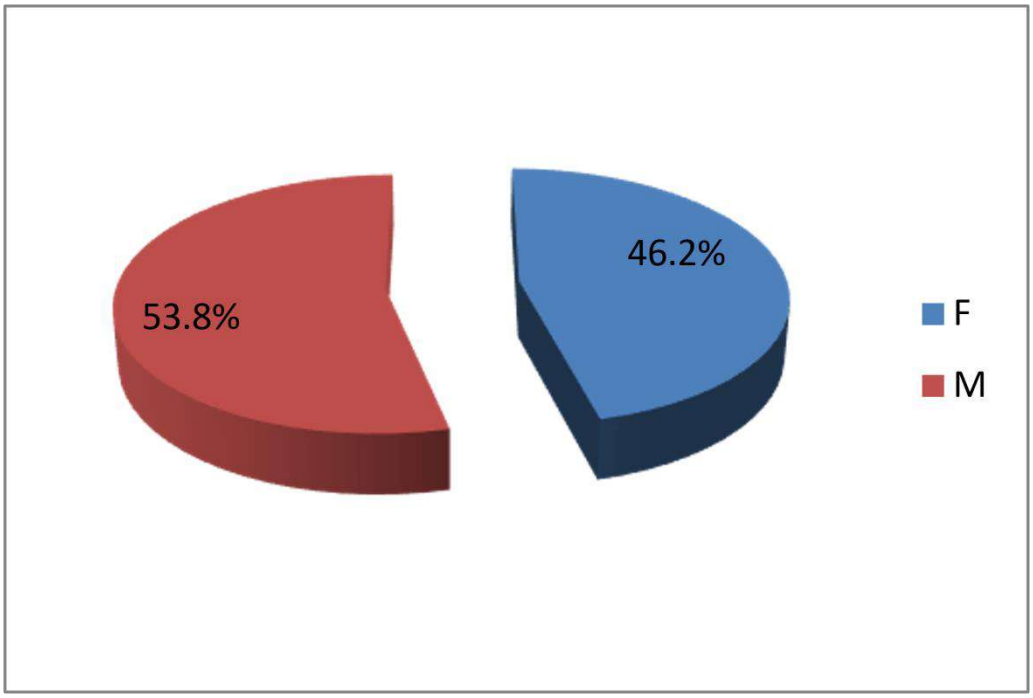


FIGURE 2 - SEX-WISE DISTRIBUTION OF PATIENTS

TABLE 3 - DISTRIBUTION OF PATIENTS ACCORDING TO THEIR MARITAL STATUS

Marital status	No. of cases	Percentage
Married	14	26.9%
Unmarried	38	73.1%
Total	52	100.0%

All the patients were queried about their marital status at the time of enrollment. Of all, 14 (26.9%) patients were married and 38 (73.1%) were unmarried.

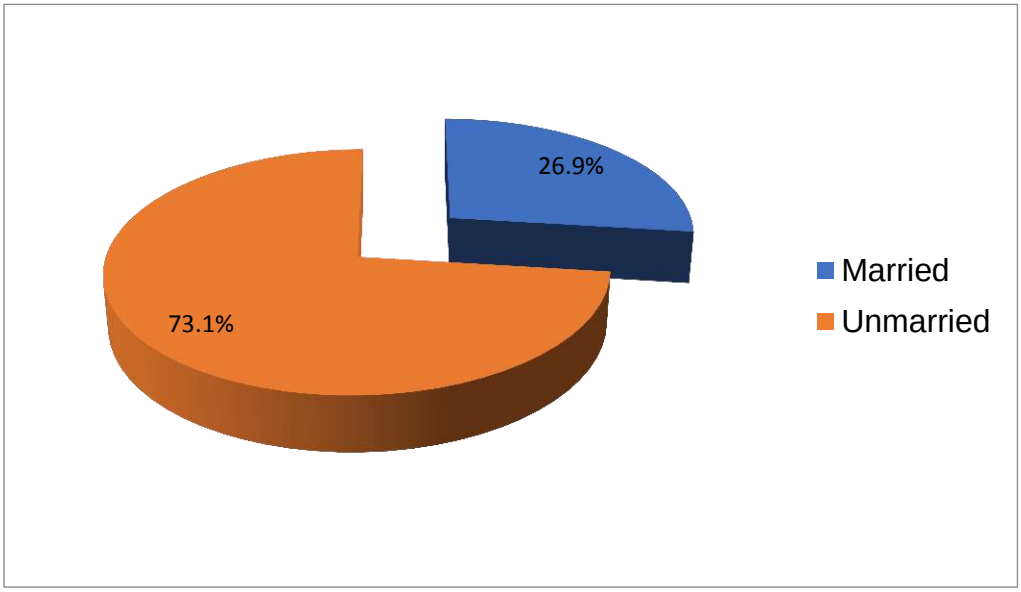


FIGURE 3 - DISTRIBUTION OF PATIENTS ACCORDING TO THEIR MARITAL STATUS

TABLE 4 - DISTRIBUTION OF PATIENTS ACCORDING TO THEIR EMPLOYMENT STATUS

Occupation	No. of cases	Percentage
Employed	10	19.2%
Housewife	10	19.2%
Student	32	61.5%
Unemployed	0	0.0%
Total	52	100.0%

On the basis of their occupation, patients were classified into different groups namely students, housewives and employed. Of 52 patients, 32 (61.5%) were students, 10 (19.2%) were housewives and 10 (19.2%) were employed. None of them were unemployed.

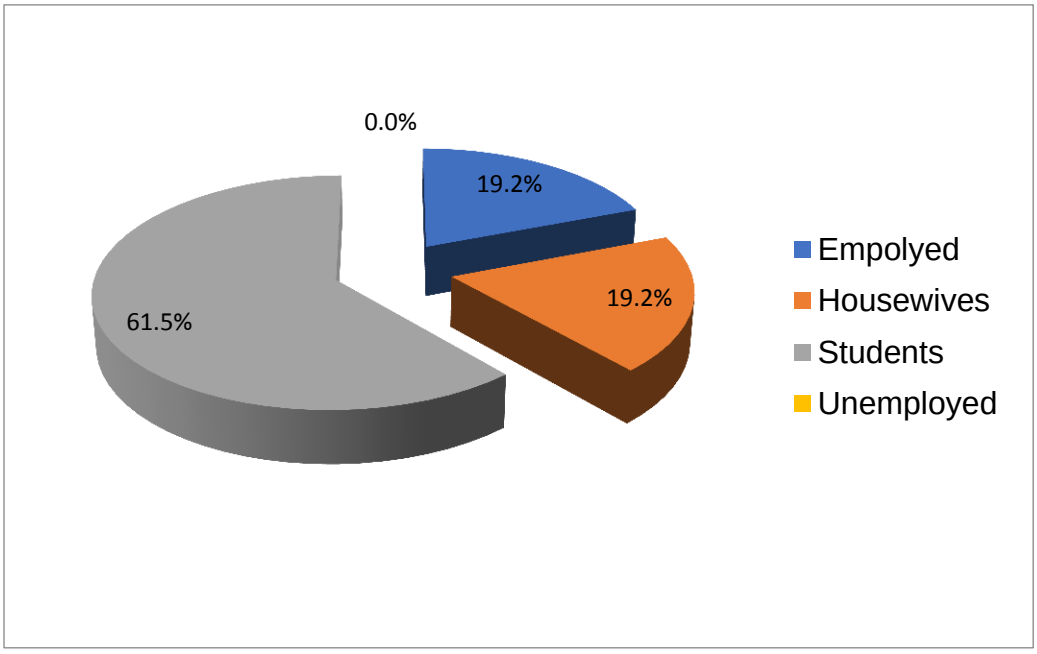


FIGURE 4 - DISTRIBUTION OF PATIENTS ACCORDING TO THEIR EMPLOYMENT STATUS

TABLE 5 - DISTRIBUTION OF PATIENTS ACCORDING TO THEIR SOCIOECONOMIC STATUS

Socioeconomic status	No. of cases	Percentage
Lower class	5	9.6%
Middle class	44	84.6%
Upper class	3	5.8%
Total	52	100.0%

The patients were classified into three groups- upper class, middle class and lower class based on their socioeconomic status. Most patients, 44 (84.6%) belonged to the middle class while only 5 (9.6%) and 3 (5.8%) belonged to the lower and upper class respectively.

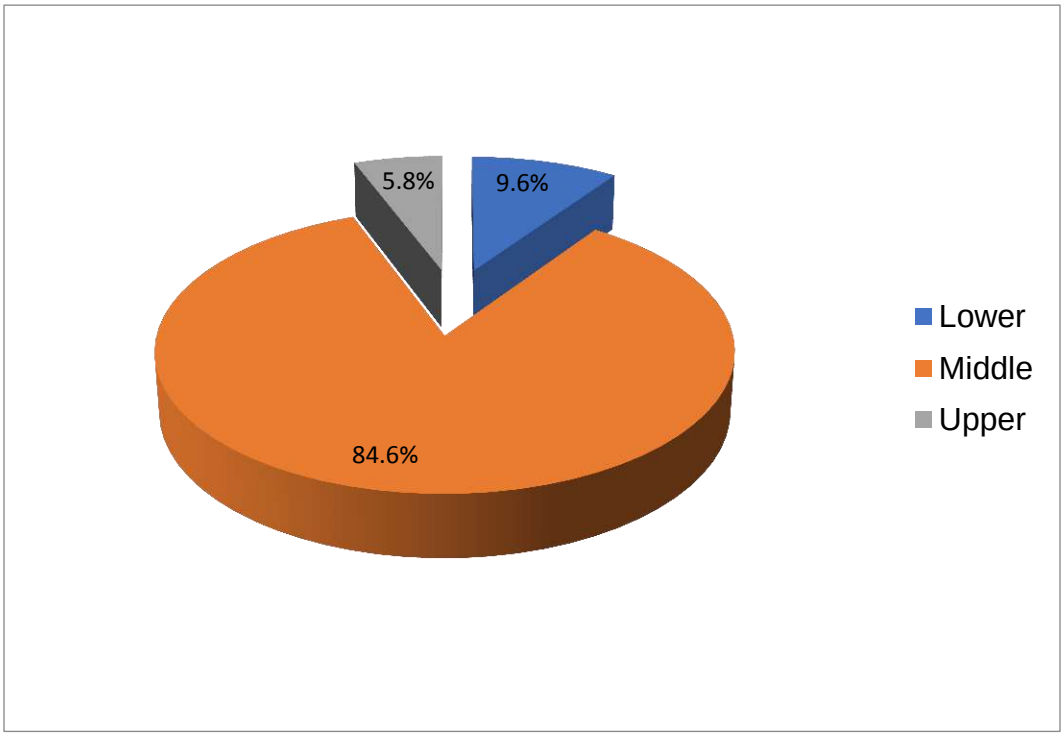


FIGURE 5 - DISTRIBUTION OF PATIENTS ACCORDING TO THEIR SOCIOECONOMIC STATUS

TABLE 6 - DISTRIBUTION OF PATIENTS ACCORDING TO SEIZURE TYPE

Seizure semiology	No. of cases	Percentage
Focal seizure	2	3.8%
B/l Tonic-Clonic	46	88.5%
Myoclonic	4	7.7%
Total	52	100.0%

A detailed history of seizures was taken from all the patients which was analysed to classify their seizure type. The highest proportion of them, 46 (88.5%) had bilateral tonic- clonic seizures followed by myoclonic seizures in 4 (7.7%)and focal seizures in 2 (3.8%) patients.

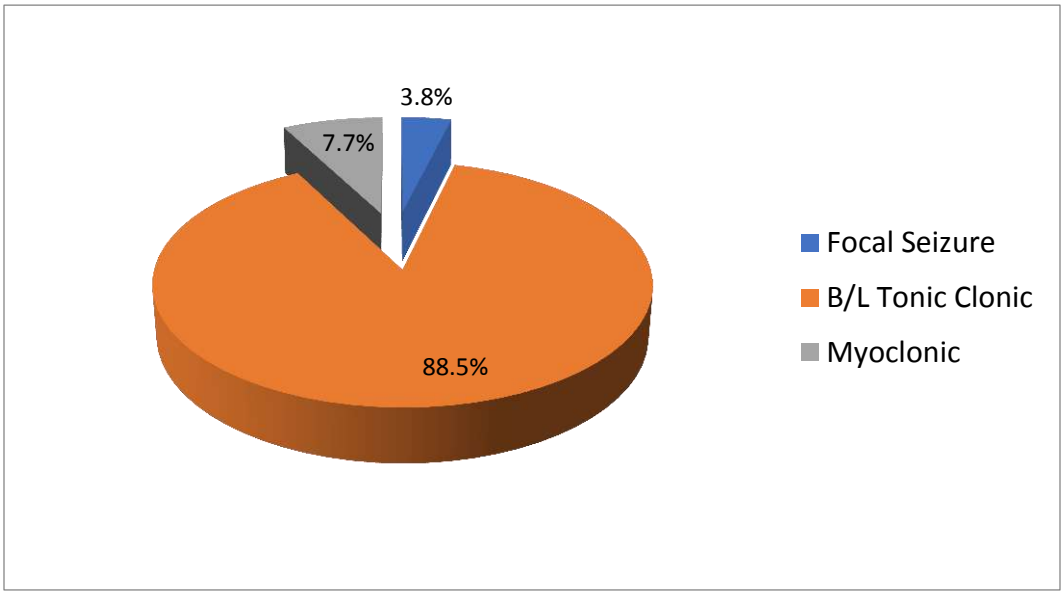


FIGURE 6 - DISTRIBUTION OF PATIENTS ACCORDING TO SEIZURE TYPE

TABLE 7 - DISTRIBUTION OF PATIENTS ACCORDING TO HISTORY OF MIGRAINE

History of Migraine	No. of cases	Percentage
N	48	92.3%
Y	4	7.7%
Total	52	100.0%

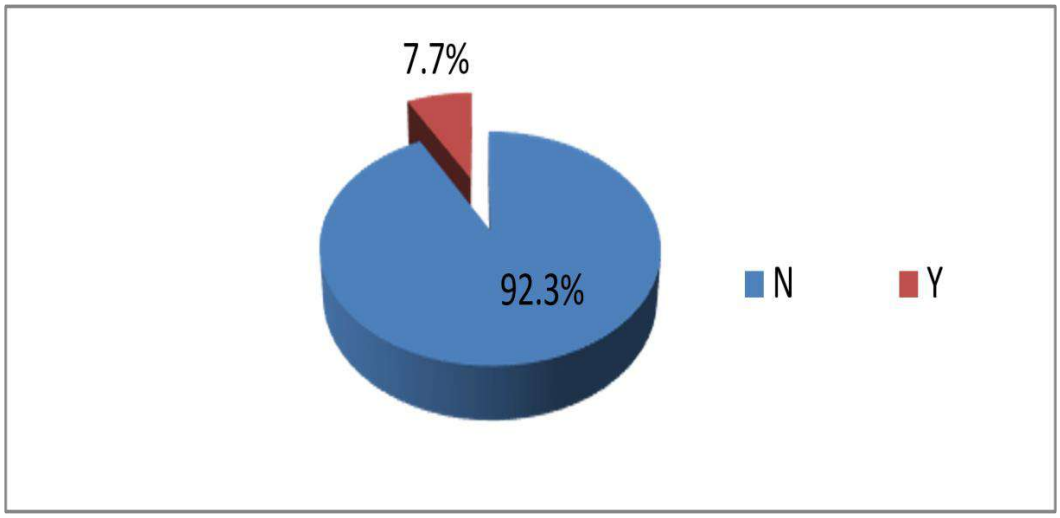


FIGURE 7 - DISTRIBUTION OF PATIENTS ACCORDING TO HISTORY OF MIGRAINE

Migraine history was recorded for all patients and it was found that 4 of 52 (7.7%) of them had previous history of migraine.

The patients were also queried about the factors that triggered their migraines. Stress was the most common trigger factor reported by all (100%) of them. Sleep deprivation, skipping of meals and strong odors/perfumes were reported by same proportion, 2 of 4 (50%) of them. Weather fluctuations, loud sounds, bright lights, and travel were reported as the trigger factor by 1 (25%) patient each.

Additionally, patients were evaluated for potential risk factors for migraine. Obesity was found to be the potential risk factor in 2 (50%) of them while only 1 (25%) of them had a family history of migraine.

TABLE 8 - DISTRIBUTION OF PATIENTS ACCORDING TO TRIGGERING FACTORS

Triggering factors for migraine	No. of cases	Percentage
Stress	4	7.7%
Hormonal fluctuation	0	0.0%
Food deprivation	2	3.8%
Weather fluctuation	1	1.9%
Sleep deprivation	2	3.8%
Perfume or odours	2	3.8%
Bright lights	1	1.9%
Alcohol	0	0.0%
Exercise	0	0.0%
Loud sound	1	1.9%

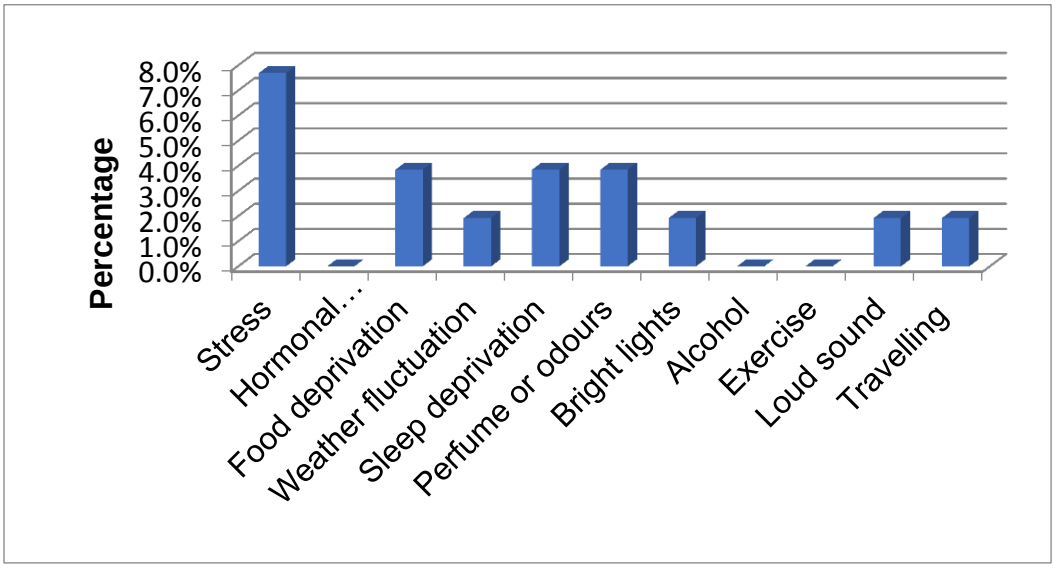


FIGURE 8 - DISTRIBUTION OF PATIENTS ACCORDING TO TRIGGERING FACTORS

TABLE 9 - DISTRIBUTION OF PATIENTS ACCORDING TO FAMILY HISTORY

Family history	No. of cases	Percentage
Epilepsy	7	13.5%
Migraine	4	7.7%
Diabetes	5	9.6%
Hypertension	3	5.8%

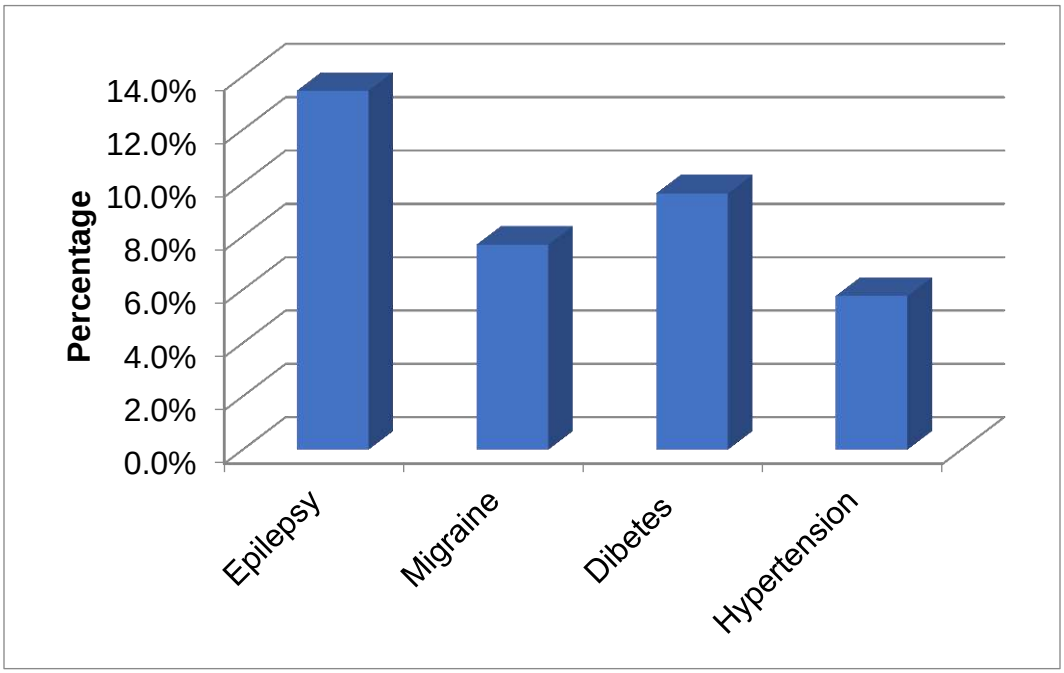


FIGURE 9 - DISTRIBUTION OF PATIENTS ACCORDING TO FAMILY HISTORY

Family history of epilepsy was present in 7 (13.5%), migraine in 4 (7.7%), diabetes in 5 (9.6%) and hypertension in 3 (5.8%) patients.

TABLE 10 - DISTRIBUTION OF PATIENTS ACCORDING TO BMI

BMI GROUP	No. of cases	Percentage
18.5-24.9	39	75.0%
25-29.9	10	19.2%
> 30	3	5.8%
Total	52	100.0%

Height and weight of all the patients was recorded. Their BMI was also calculated. Of all, 39 (75%) patients had BMI in the range of 18-24.9, 10 (19.2%) had BMI in the range of 25-29.9 and 3 (5.8%) had BMI more than 30.

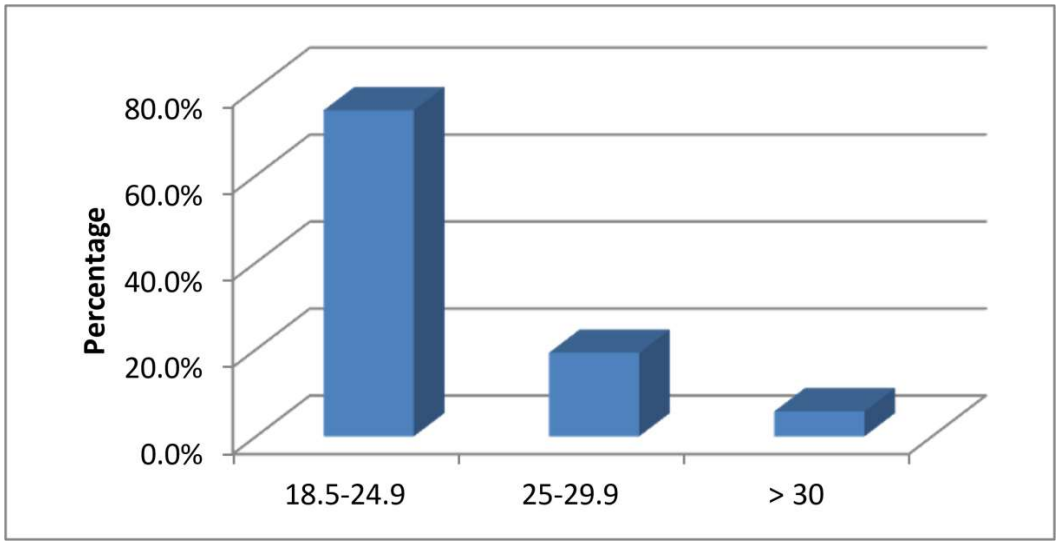


FIGURE 10 - DISTRIBUTION OF PATIENTS ACCORDING TO BMI

TABLE 11 - DISTRIBUTION OF PATIENTS ACCORDING TO ANTI SEIZURE MEDICATIONS

Name of the drug	No. of cases	Percentage
Carbamazepine	4	7.7%
Levetiracetam	29	55.8%
Phenytoin	2	3.8%
Valproate	17	32.7%
Total	52	100.0%

During the study, patients were started on different ASM's as per the choice of treating neurologist. Levetiracetam was the most commonly used ASM in our study 29/52 patients (55.8%), followed by Valproate 17/52(32.7%). Carbamazepine was used in 4/52 patients(7.7%), Phenytoin was used in 2/52 patients(3.8%).

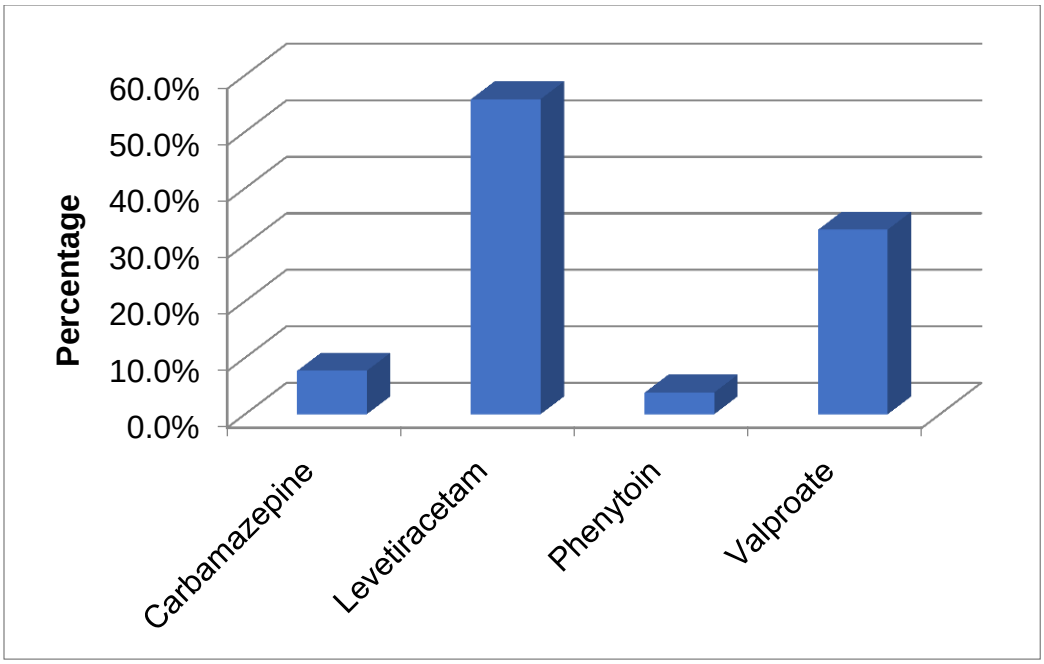


FIGURE 11 - DISTRIBUTION OF PATIENTS ACCORDING TO ANTI SEIZURE MEDICATIONS

TABLE 12 - DISTRIBUTION OF PATIENTS ACCORDING TO ANTI SEIZURE MEDICATION RELATED ADVERSE EFFECTS

Adverse Drug Reaction	No. of cases	Percentage
Aggressive mood	1	1.9%
Ataxia	1	1.9%
Non Migranous Headache	2	3.8%
None	44	84.6%
Sedation	3	5.8%
Weight Gain	1	1.9%
Total	52	100.0%

Adverse effects of ASM were reported by 8/52(15.38%) patients. 44/52 (84.6%) patients in our study didn't report any adverse effect to the ASM. The adverse effect which were reported were, sedation 3/52 (5.8%), 2 reported headache other than migraine(3.8%), aggressive mood 1/52(1.9%), ataxia 1/52(1.9%), and weight gain 1/52(1.9 %).

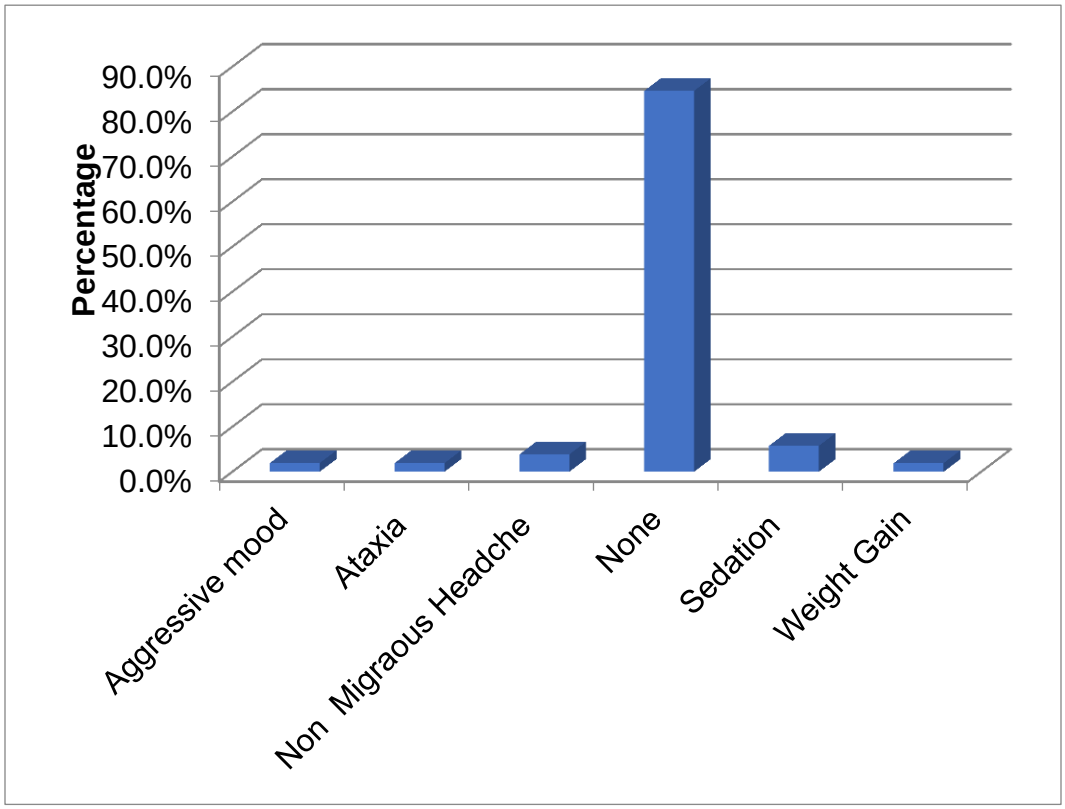


FIGURE 12 - DISTRIBUTION OF PATIENTS ACCORDING TO ANTI SEIZURE MEDICATION RELATED ADVERSE EFFECTS

TABLE 13 - DISTRIBUTION OF PATIENTS ACCORDING TO PRESENCE/ABSENCE OF MIGRAINE

Migraine	No. of cases	Percentage
N	43	82.7%
Y	9	17.3%
Total	52	100.0%

In the present study, 9/52 patients (17.3%) had migraine.

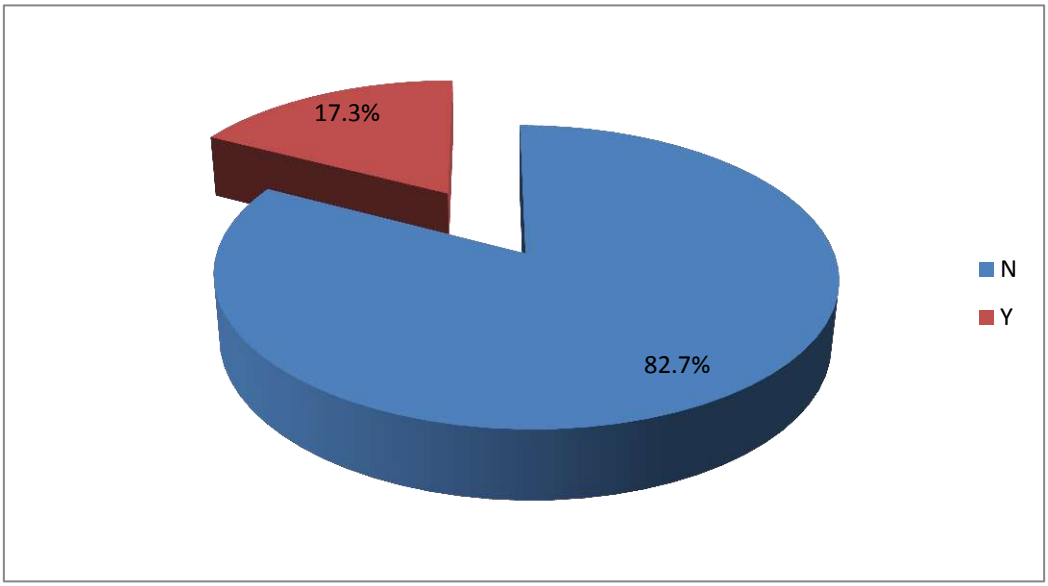


FIGURE 13 - DISTRIBUTION OF PATIENTS ACCORDING TO PRESENCE/ABSENCE OF MIGRAINE

TABLE 14 - DISTRIBUTION OF PATIENTS ACCORDING TO TOTAL EPISODES OF MIGRAINE

Migraine Total Episode	No. of cases	Percentage
< 5	1	11.1%
5-10.0	5	55.6%
> 10	3	33.3%
Total	9	100.0%

5/9 patients (55.6%) had 5- 10 episodes of migraine over the period of 3 months, 3 patients(33.3%) had > 10 episodes of migraine, while 1(11.11%) patient had < 5 episodes of migraine. The patient who had less than 5 episodes of migraine was a known case of migraine. The HIT-6 scores were also recorded, HIT-6 scores ranged from 40 -56.

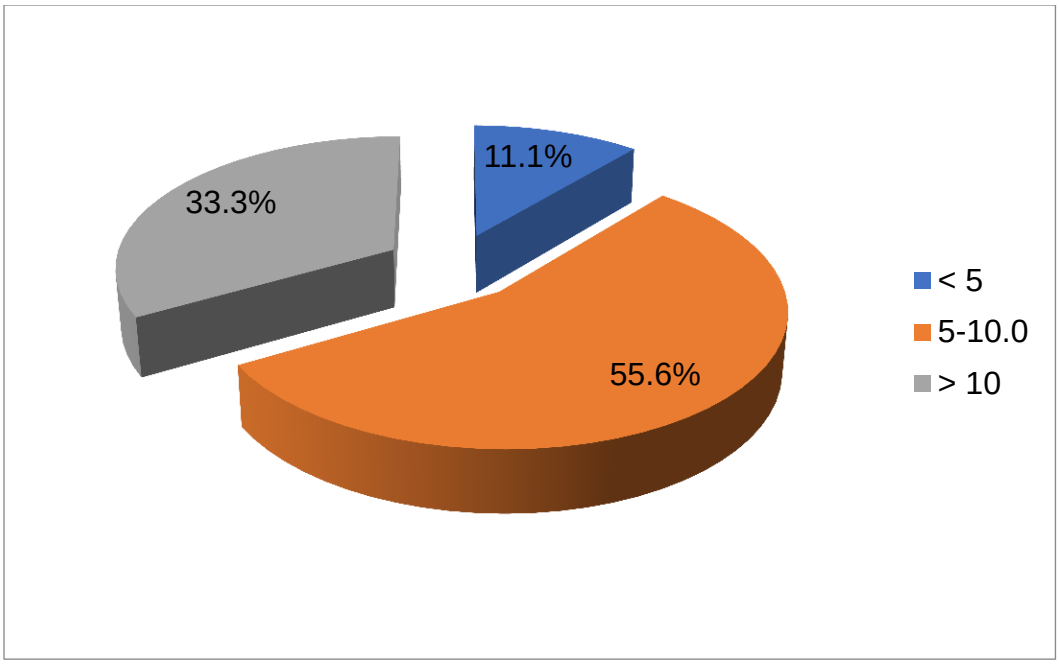


FIGURE 14 - DISTRIBUTION OF PATIENTS ACCORDING TO TOTAL EPISODES OF MIGRAINE

CHARACTERISTICS OF STUDY PARTICIPANTS

The mean age of patients in the current study was 20.21 ± 8.24. mean height was 63.50 ± inches, mean weight was 60.1± 13.25 kg, mean BMI was 22.96 ±3.73, mean HIT-6 scores were 48.89 ± 5.69.

TABLE 15 - CHARACTERISTICS OF STUDY PARTICIPANTS

	N	Mean	Std. Deviation	Minimum	Maximum	Median	IQR
Age	52	20.21	8.24	8.00	40.00	17.50	14-25
BMI	52	22.96	3.73	18.80	33.80	21.90	19.9-25.05
Height	52	63.50	5.60	45.00	72.00	65.00	60-67
Weight	52	60.10	13.25	25.00	92.00	60.00	50.5-70
HIT-6	9	48.89	5.67	40.00	56.00	49.00	44-54.5

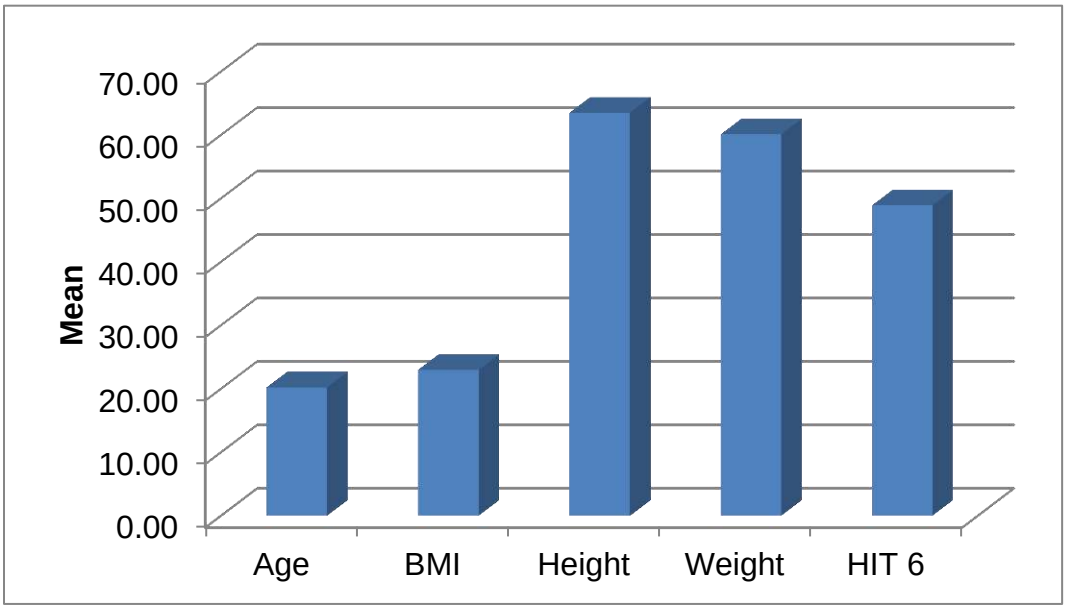


FIGURE 15 - CHARACTERISTICS OF STUDY PARTICIPANTS

COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S AGE

Migraine was analyzed according to the patient's age, although migraine was more in the age group 11-20, and 21 -30 years, no statistically significant difference was noted. (p-value= .785)

Table 16 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S AGE

		Migraine				Total	Chi-square value	p-value
		N		Y				
Age group	< 10	3	7.0%	0	0.0%	3	1.065	0.785
	11-20.0	23	53.5%	5	55.6%	28		
	21-30	10	23.3%	3	33.3%	13		
	> 30	7	16.3%	1	11.1%	8		
Total		43	100.0%	9	100.0%	52		

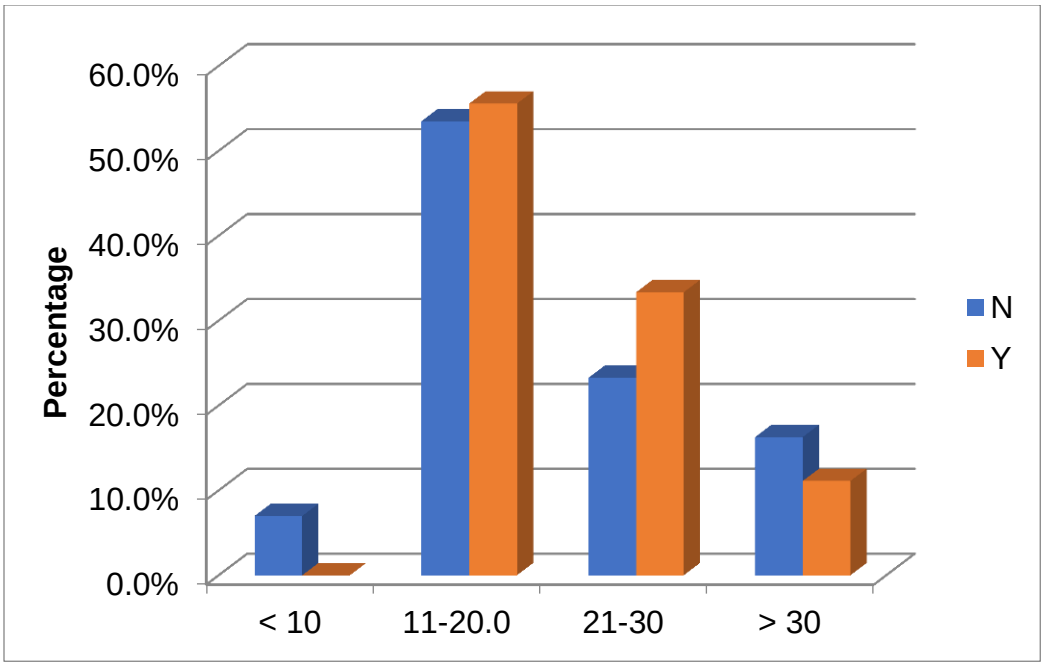


FIGURE 16 - COMPARISON OF MIGRAINE ACCORDING TO PATIENTS AGE

COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S GENDER

Migraine was also analyzed according to the gender of the patients. It was more common in females as compared to males. However, the difference was not statistically significant. (p-value = .064)

Table 17 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S GENDER

		Migraine				Total	Chi-square value	p-value
		N		Y				
Gender	F	17	39.5%	7	77.8%	24	4.38	0.064
	M	26	60.5%	2	22.2%	28		
Total		43	100.0 %	9	100.0 %	52		

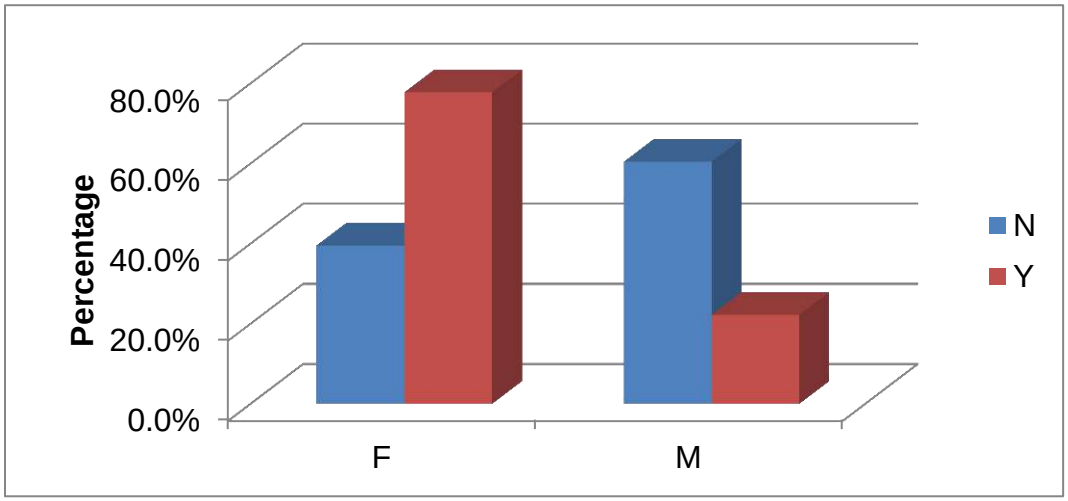


FIGURE 17 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S GENDER

COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S OCCUPATIONAL STATUS

Migraine was analyzed as per the occupational status of the patient, it was more common in students as compared to the other groups, but the difference was not statistically significant. (p-value = .458)

TABLE 18 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S OCCUPATIONAL STATUS

		Migraine				Total	Chi-square value	p-value
		N		Y				
Occupation	Employed	9	20.9%	1	11.1%	10	1.562	0.458
	Housewives	7	16.3%	3	33.3%	10		
	Students	27	62.8%	5	55.6%	32		
Total		43	100.0%	9	100.0%	52		

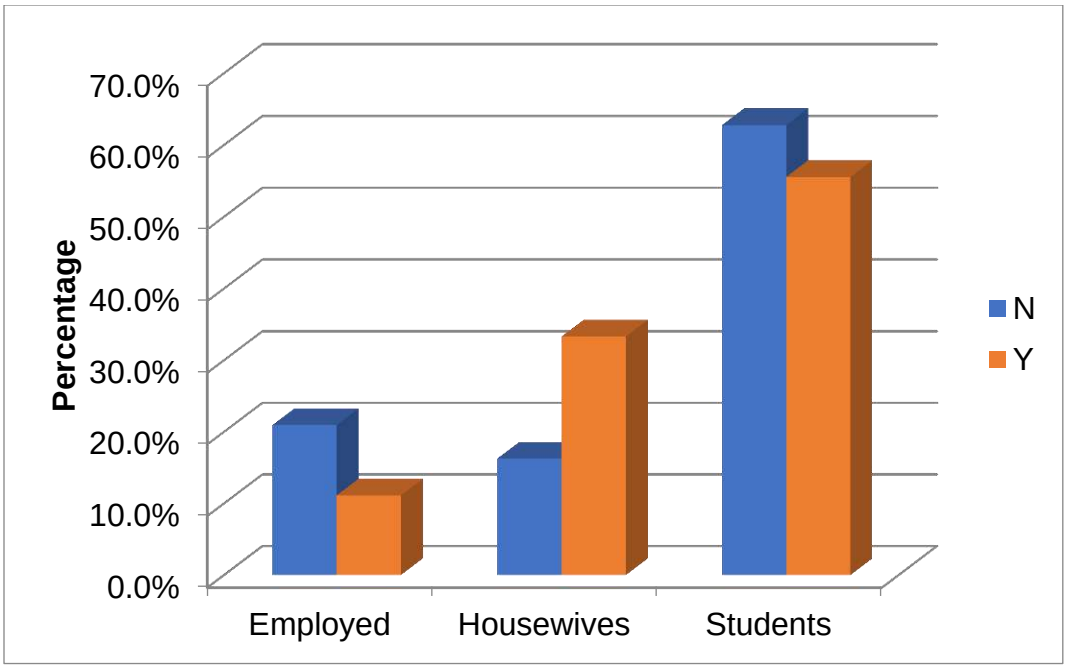


FIGURE 18 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S OCCUPATIONAL STATUS

COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S SEIZURE TYPE

Patients with migraine were compared between those who had bilateral tonic-clonic seizure vs focal seizure vs myoclonic seizure. Migraine was more common in those patients who had B/l Tonic Clonic seizures, but the difference was not statistically significant. (p-value = .170)

Table 19 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S SEIZURE TYPE

		Migraine				Total	Chi-square value	p-value
		N		Y				
Seizure semiology	Focal seizure	2	4.7%	0	0.0%	2	3.546	0.170
	B/l Tonic Clonic	39	90.7%	7	77.8%	46		
	Myoclonic	2	4.7%	2	22.2%	4		
Total		43	100.0%	9	100.0%	52		

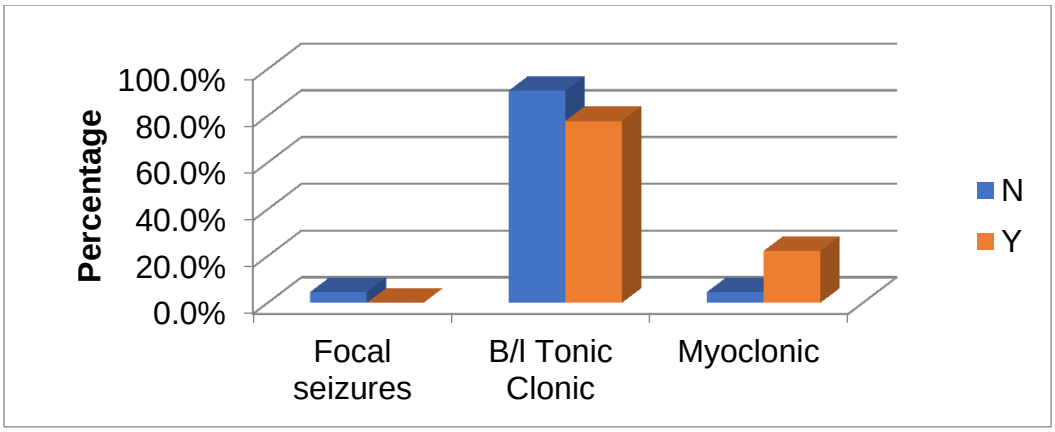


FIGURE 19 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S SEIZURE TYPE

COMPARISON OF MIGRAINE ACCORDING TO PRESCRIBED ANTI SEIZURE MEDICATIONS

Migraine was also analyzed according to the anti seizure medications taken by the patient. Migraine was found to be common in those patients who were on levetiracetam, but this difference was not statistically significant. (p value = .463)

TABLE 20 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S PRESCRIBED ANTI SEIZURE MEDICATIONS

		Migraine				Total	Chi-square value	p-value
		N		Y				
Name of the drug	Carbamazepine	4	9.3%	0	0.0%	4	2.566	0.463
	Levetiracetam	22	51.2%	7	77.8%	29		
	Phenytoin	2	4.7%	0	0.0%	2		
	Valproate	15	34.9%	2	22.2%	17		
Total		43	100.0%	9	100.0%	52		

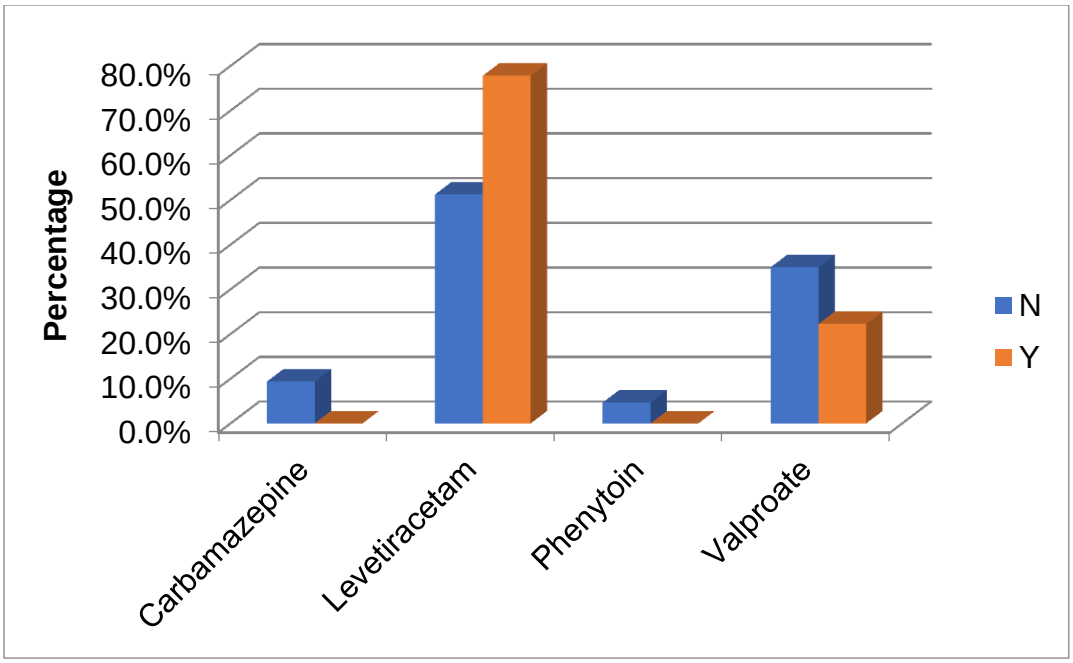


FIGURE 20 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S PRESCRIBED ANTI SEIZURE MEDICATIONS

COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S MARITAL STATUS

Migraine was also analyzed as per the marital status of the patient, it was more in those who were unmarried, but this difference was not statistically significant.(p-value = .634)

TABLE 21 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S MARITAL STATUS

		Migraine				Total	Chi-square value	p-value
		N		Y				
Marital status	Married	11	25.6%	3	33.3%	14	0.227	0.634
	Unmarried	32	74.4%	6	66.7%	38		
Total		43	100.0%	9	100.0%	52		

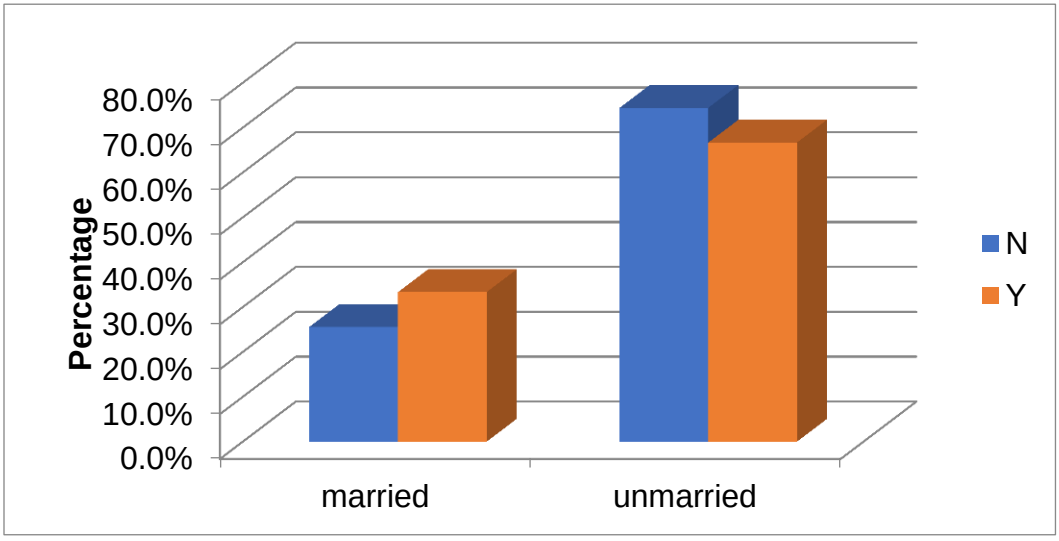


FIGURE 21 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S MARITAL STATUS

COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S SOCIOECONOMIC STATUS

Migraine was compared amongst the different socioeconomic statuses, it was more common in the middle class, but the difference between the groups was not statistically significant. (p-value = .288)

TABLE 22 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S SOCIOECONOMIC STATUS

		Migraine				Total	Chi-square value	p-value
		N		Y				
Socioeconomic status	Lower class	3	7.0%	2	22.2%	5	2.487	0.288
	Middle class	37	86.0%	7	77.8%	44		
	Upper class	3	7.0%	0	0.0%	3		
Total		43	100.0%	9	100.0%	52		

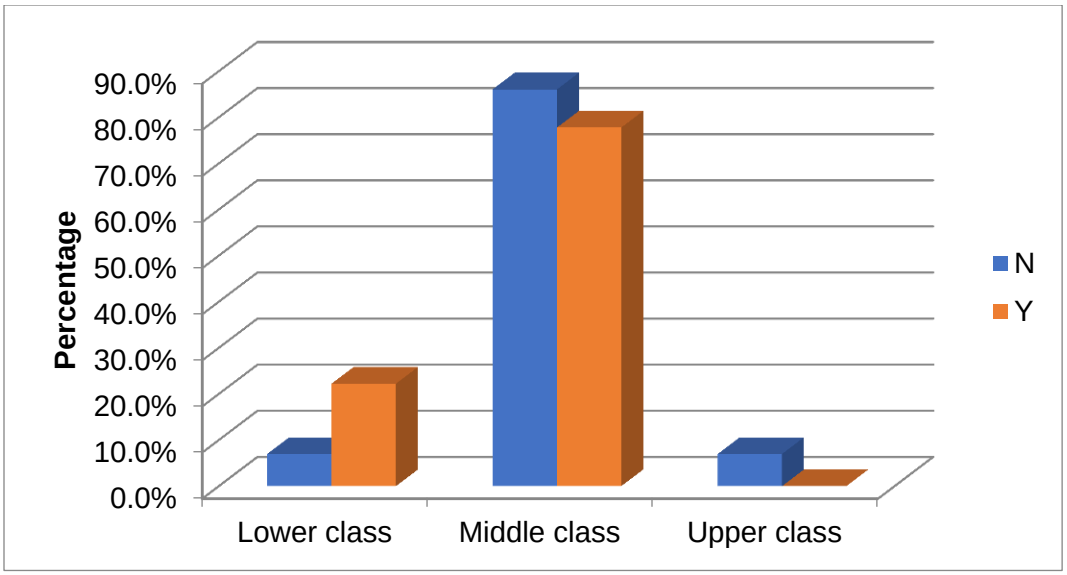


FIGURE 22 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S SOCIOECONOMIC STATUS.

COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S BMI

Migraine was also analyzed as per the BMI status of the patients, it was more common in the BMI of 18.5 – 24.9, but the difference was not statistically significant. (p-value = .396)

TABLE 23 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S BMI

		Migraine				Total	Chi-square value	p-value
		N		Y				
BMI GROUP	< 24.9	33	76.7%	6	66.7%	39	1.854	0.396
	25-29.9	7	16.3%	3	33.3%	10		
	> 30	3	7.0%	0	0.0%	3		
Total		43	100.0%	9	100.0%	52		

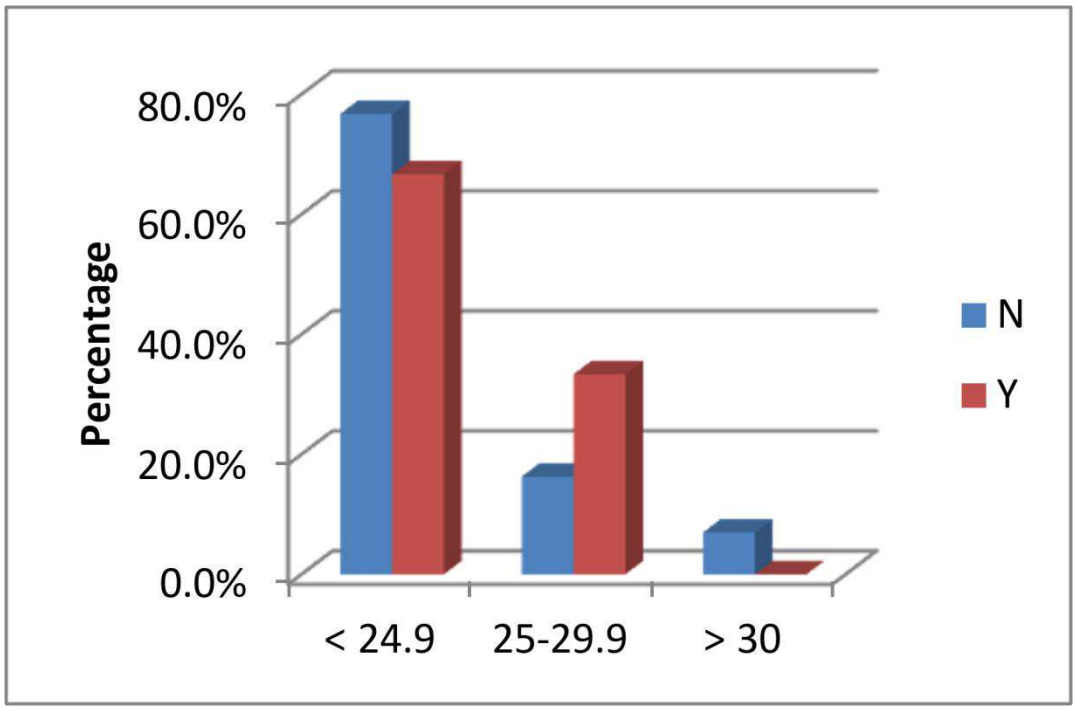


FIGURE 23 - COMPARISON OF MIGRAINE ACCORDING TO PATIENT'S BMI

COMPARISON OF MIGRAINE ACCORDING TO MEAN AGE OF PATIENTS

The mean age of the patients who did not have migraine was 20 ± 8.45, whereas those who had migraine was 21.22 ± 7.51. the age difference was statistically non-significant. (p-value = .690)

TABLE 24 - COMPARISON OF MIGRAINE ACCORDING TO MEAN AGE OF PATIENTS

Migraine	N		Y		Z	p-value
	Mean	SD	Mean	SD		
Age	20.00	8.45	21.22	7.51	-0.401	0.690

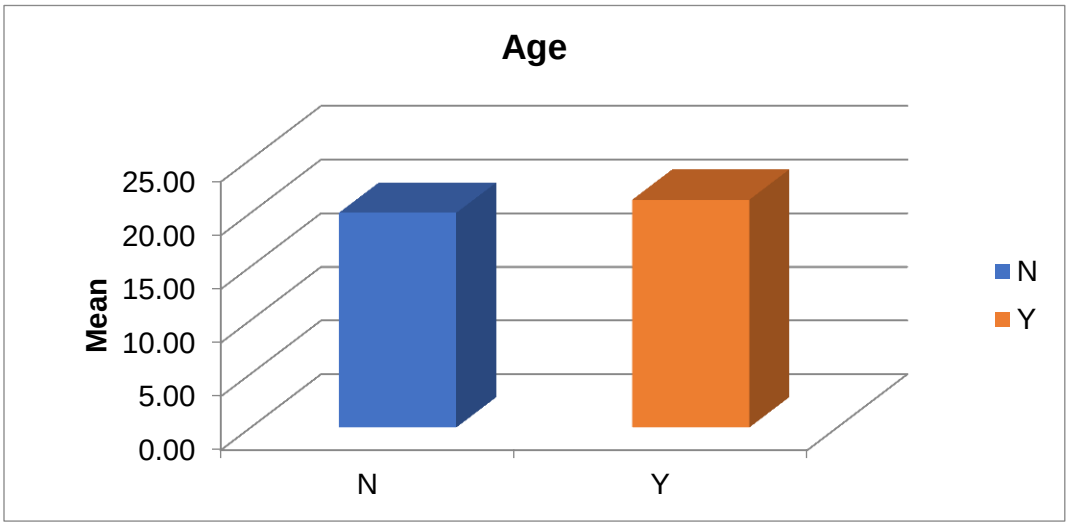


FIGURE 24 – COMPARISON OF MIGRAINE ACCORDING TO MEAN AGE OF PATIENTS

COMPARISON OF MIGRAINE ACCORDING TO MEAN BMI OF PATIENTS

The mean BMI of the patient who developed migraine was 22.70 $\pm$ 3.71 whereas for those who didn't have migraine was 23.02 $\pm$ 3.77, the difference was not statistically significant. (p-value = .820).

TABLE 25 - COMPARISON OF MIGRAINE ACCORDING TO MEAN BMI OF PATIENTS

Migraine	N		Y		Z	p-value
	Mean	SD	Mean	SD		
BMI	23.02	3.77	22.70	3.71	0.229	0.820
Height	63.30	5.97	64.44	3.43	-0.552	0.583
Weight	59.96	13.83	60.78	10.65	-0.167	0.868

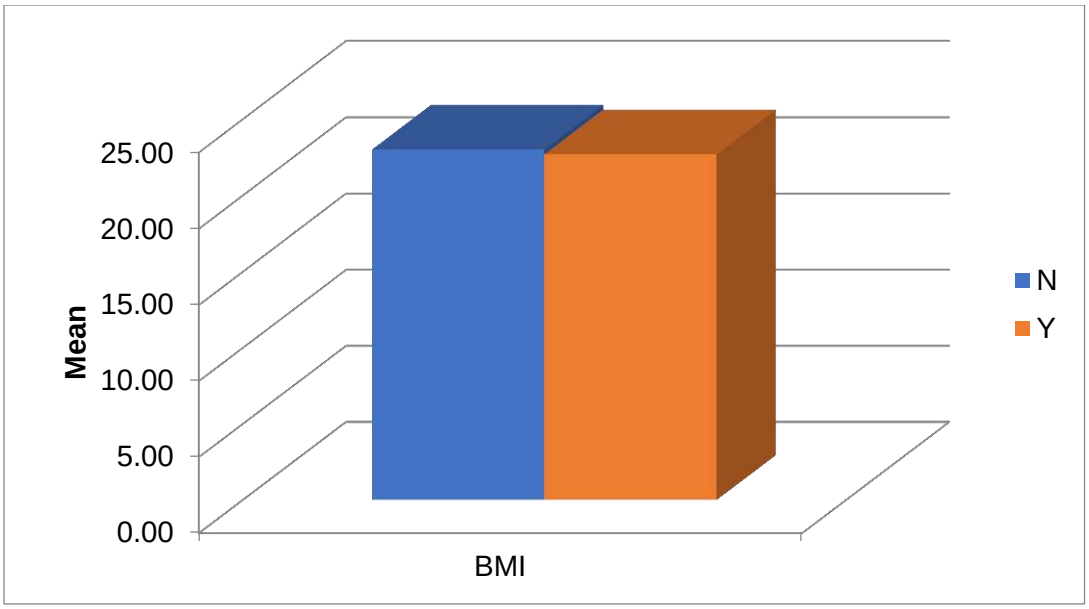


FIGURE 25 - COMPARISON OF MIGRAINE ACCORDING TO MEAN BMI OF PATIENTS

COMPARISON OF MIGRAINE ACCORDING TO MEAN DOSE OF ANTI SEIZURE MEDICATIONS

Patients on levetiracetam who developed migraine were taking a mean dose of 1285.71 $\pm$ 267.26 mg, whereas those who didn't develop migraine were taking a mean dose of 1340 $\pm$ 389.44 mg. The difference in the mean dose was statistically insignificant. (p-value = .583)

TABLE 26 - COMPARISON OF MIGRAINE ACCORDING TO MEAN DOSE OF LEVETIRACETAM

Migraine	N				Y				Z	p-value
Levetiracetam	Mean	SD	Median	IQR	Mean	SD	Median	IQR		
Total dose (mg)	1340.91	389.944	1500.00	1000-1500	1285.71	267.261	1500.00	1000-1500	-0.549	0.583

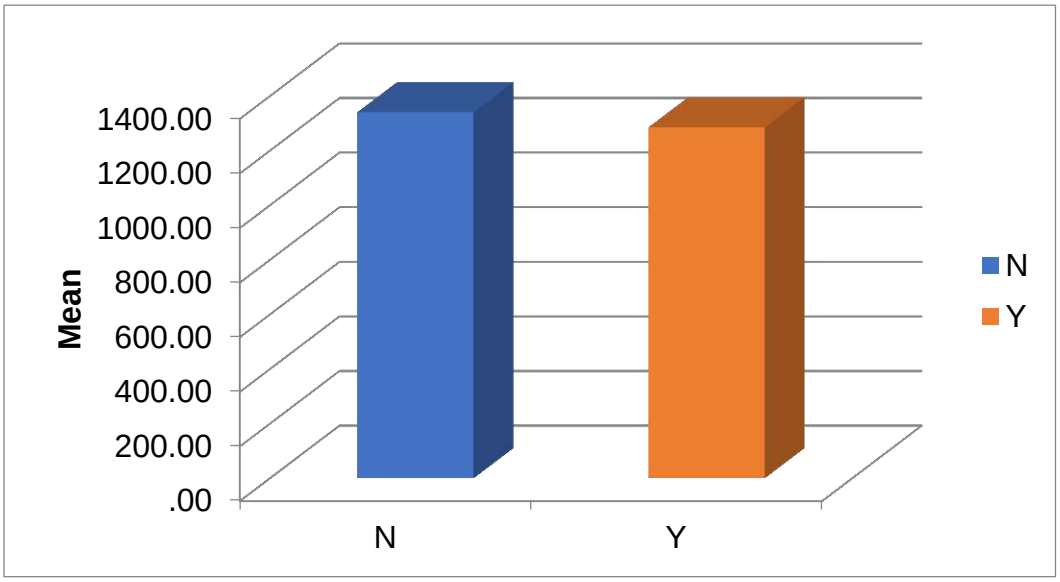


FIGURE 26 - COMPARISON OF MIGRAINE ACCORDING TO MEAN DOSE OF LEVETIRACETAM

Similarly, patients who were on valproate, and who developed migraine, were taking a mean dose of 800 ± 282.843 mg, while those who didn't develop migraine were taking a mean dose of 773.33 ± 198 mg. The difference was not statistically significant. (p-value = .875).

TABLE 27 - COMPARISON OF MIGRAINE ACCORDING TO MEAN DOSE OF VALPROATE

Migraine	N				Y				Z	p-value
Valproate	Mean	SD	Median	IQR	Mean	SD	Median	IQR		
Total dose (mg)	773.33	198.080	800.00	600-1000	800.00	282.843	800.00	600.00	-0.157	0.875

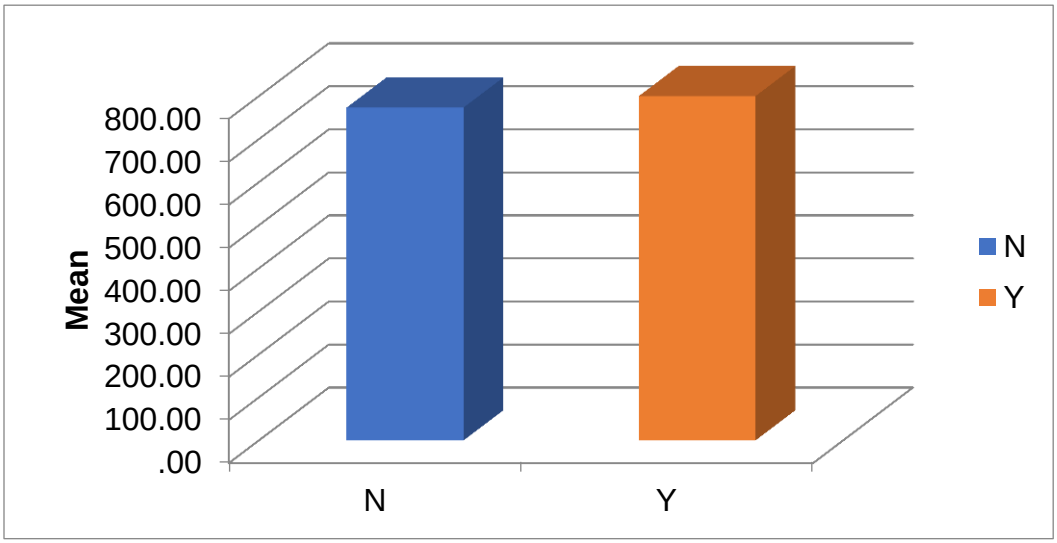


FIGURE 27 - COMPARISON OF MIGRAINE ACCORDING TO MEAN DOSE OF VALPROATE

DISCUSSION

In our study, the majority of epilepsy patients were males as observed in other studies conducted in India. Raina et al reported prevalence in males (15.4/1000) vs females (6.8/1000). Similar findings were reported by, Banerjee et al, 6.6/1000 males vs 5.2/1000 females, Radhakishan et al, 5.2/1000 males vs 4.7/1000 females and Shah et al, 3.7/1000 males vs 3.1/1000 females. In our study, there was no significant difference between the number of males and females affected by epilepsy which was in concordance with Banerjee et al and Shah et al.[46]

The most common type of seizure reported in our study was bilateral tonic-clonic seizure (88.5%). This finding was in accordance with a study conducted by Koul et al. In their study, they found that the most common type of seizure was generalised tonic clonic. Primary generalized seizures were also found to be the most common type of seizures (45% - 86%) in epilepsy patients in a meta-analysis conducted by R Sridharan et al.[47,48]

In a study conducted by Radhakrishnan et al, the maximum prevalence of epilepsy was observed to occur in the second decade of life. It was concluded in the study that the onset of epilepsy occurs in the first, second or third decades of the patient's life. Similar findings were observed in our study as well. New onset epilepsy was most common in the age group of 11 – 20 years (53.8%).[48,49]

In Satishchandra et al., positive family history of epilepsy was found in 13.7% of patients which is similar to our study where a positive family history of epilepsy was found in 13.5% of patients.[50]

The majority of the patients with new onset generalized and focal epilepsy included in our study were unmarried.

In the present study, the mean age of patients was 20.21 ± 8.24 which was similar to the findings in the study conducted by Atalar C et al where the mean age of patients was 25.35 ± 5.75.[31]

Our study highlighted that migraine was present in 9/52 (17.3%) patients with generalized or focal epilepsy. Of these 9 patients who had migraine, 4 were previously diagnosed cases of migraine while 5 had new onset migraine. Different studies have reported different prevalence of migraine in patients with epilepsy. Whealy et al reviewed the literature on the epidemiology of headache in epilepsy. They found that 7% - 57% of patients with epilepsy report interictal headache and migraine is present in 2% - 26.3% of this population. In their review of the prevalence of headache in people with epilepsy, Atalar C et al found that the reported prevalence of migraine in people with epilepsy across different studies ranges between 14% -24%. So, the results of our study are in concordance with their findings. However, Whealy et al, found the prevalence of migraine to be 41% while Atalar et al found it to be 41.4% in their own respective studies. This highlights the wide variation that occurs in the results of studies. This variation could be due to the heterogeneity in the study population, study methods or various other factors including the anti seizure medications used in the study.[9,31]

The mean age of patients who developed migraine was 21.22 ± 7.51, whereas the mean age of those who didn't develop migraine was 20.00 ± 8.45. No significant difference in age was found in our study which was similar to the findings in the HELP study where no significant difference in age was found. [51]

Our study didn't find any significant difference in the mean BMI of patients who developed migraine and those who didn't develop migraine.

More female patients with epilepsy developed migraine in our study as compared to male patients. However, the difference between the two groups was not found to be statistically significant.

In our study, the majority of the patients with epilepsy who had migraine were unmarried (6/9, 66.7%). However, the difference between the two groups was not statistically significant.

Patients who had migraine and belonged to the middle class were 7 of 9 (77.8%) while those who had migraine and belonged to the lower class were 2 (22.2%). Though, their number varied largely but when compared, the difference between these two groups was not statistically significant.

The difference was not statistically significant between the two groups of patients with migraine of which one had bilateral tonic clonic seizures 7 of 9 (77.8%) while the other had myoclonic seizures, 2 of 9 (22.2%).

In our study, out of 9 patients who developed migraine 7 were on levetiracetam, and 2 were on valproate. The difference between the two groups was not significant. This is in concordance with the study conducted by Schiller et al, who found no difference in the incidence of migraine in patients with epilepsy who were on levetiracetam, valproate, topiramate, carbamazepine and lamotrigine monotherapy.[52]

The current study supports the previous observations of the high prevalence of migraine in epilepsy patients. It also reinforces the association between migraine and epilepsy. The exact mechanisms of the shared pathophysiology between migraine and epilepsy are debatable. Cortical hyperexcitability appears to be the common mechanism between migraine and epilepsy.

Migraine is an underdiagnosed condition in the general population as well as in people with epilepsy. It adds to the existing morbidity of patients suffering from epilepsy. Recognition of migraine and its risk factors is

important. People with epilepsy who are having migraine or are at increased risk of migraine can be treated with ASM having anti migranous properties. Also, it may help in preventing the attacks of migraine thereby reducing the morbidity in people with epilepsy.

SUMMARY AND CONCLUSION

Migraine is a common comorbidity in people with epilepsy and it is often neglected by both patients and their treating physicians. In our study on headache in people with epilepsy, we included 52 patients with newly diagnosed idiopathic generalized and focal epilepsy attending the neurology outpatient department who were started on single ASM. Out of those patients who were enrolled in the study, 9 had migraine. There were 28 (53.8%) males and 24 (46.2%) females among the group. Among all, bilateral tonic clonic seizures were present in 46 (88.5%), focal seizures in 2 (3.8%) and myoclonic seizures in 4(7.7%) patients. Family history of epilepsy and migraine was taken, epilepsy was present in 7 (13.5%) patients while migraine was present in 4(7.7%) patients. Migraine was more common in females, unmarried individuals, and in age group 11- 20 years, but, the difference was not statistically significant. Various ASMs were prescribed to different patients. Levetiracetam was started for 29 (55.8%), sodium valproate for 17 (32.7%), carbamazepine for 4 (7.7%) and phenytoin for 2 (3.8%) patients. Though migraine was found to be more frequent in patients on levetiracetam, it was not statistically significant (p-value=0.463).

The frequency of migraine is more in people with idiopathic epilepsy as compared to the general population. It is an important comorbidity in epilepsy. We tried to find the risk factors for migraine in people with epilepsy by studying the association of various factors such as age, sex, BMI, employment status, marital status, anti seizure medication etc. with migraine. No significant association was found in our study with any of the above variables. Our study included patients with idiopathic generalized and focal epilepsy who were not on any treatment. Also, they were eligible only if they were started on a single ASM. This may have led to the limitation of the sample size in our study. Due to the small number of patients included in the study, further studies with larger sample sizes are

required to establish the exact risk factors for migraine in people with idiopathic generalized and focal epilepsy.

Strengths

This was a prospective study including patients who had idiopathic generalized and focal epilepsy were enrolled. Very few studies exploring the association between migraine and epilepsy have selectively focussed on idiopathic generalized and focal epilepsies.

The major strength of our study was the confirmed diagnosis of Migraine and Epilepsy which was done by the neurologists.

There is also a low risk of recall bias as the patients were followed up every month and they were also provided with a headache calendar to note the headache events.

Limitations

As our study had enrolled only patients with idiopathic generalized and focal epilepsy who were started on single ASM, the total number of eligible patients was 52. Follow up period in our study was 3 months, which might have led to the underestimation of the prevalence of migraine in idiopathic generalized/ focal epilepsy. Patients were recruited from a Tertiary care center, so the possibility of selection bias cannot be ruled out.

Future directions

Larger studies with longer follow-up periods are needed to understand the risk factors for migraine in people with idiopathic generalized and focal epilepsy.

BIBLIOGRAPHY

1. PanteliadisCP, Vassilyadi P, Fehlert J, Hagel C. Historical documents on epilepsy: From antiquity through the 20th century. Brain Dev. 2017;39:457-63.
2. Fisher RS, Acevedo C, Arzimanoglou A, Bogacz A, Cross JH, Elger CE, et al. ILAE official report: a practical clinical definition of epilepsy. Epilepsia. 2014;55:475-82.
3. Epilepsy. World Health Organization.Available from: http://www.who.int/news-room/fact-sheets/detail/epilepsy. [Last accessed on 2021 June 21]
4. Dhiman V, Menon G, Kaur S, Mishra A, John D, Rao Vishnu M, et al. A Systematic Review and Meta-analysis of Prevalence of Epilepsy, Dementia, Headache, and Parkinson's Disease in India. Neurology India.2021;69:294-301.
5. Garza I, Robertson CE, Smith JH, Whealy MA. “Headache and Other Craniofacial Pain,” in Bradley and Daroff's neurology in Clinical Practice, 2-volume set. 8th edn. S.l.: ELSEVIER - HEALTH SCIENCE,2021;1757–1757.
6. Migraine (2019) ICHD. Available at: https://ichd-3.org/1-migraine/ (Accessed: May 11, 2023).
7. Martin VT, Behbehani MM. Toward a rational understanding of migraine trigger factors. Med Clin North Am. 2001;85:911–41
8. Garza I, Robertson CE, Smith JH, Whealy MA. Headache and Other Craniofacial Pain. In: Bradley and Daroff's neurology in Clinical Practice, 2-volume set. 8th ed. S.l.: ELSEVIER - HEALTH SCIENCE; 2021. p. 1757.
9. Whealy MA, Myburgh A, Bredesen TJ, Britton JW. Headache in epilepsy: a prospective observational study. Epilepsia Open.2019;4:593–8.
10. Ertas M, Baykan B, OrhanEK, Zarifoglu M, Karli N, Saip S, et al. One-year prevalence and the impact of migraine and tension-type

headache in Turkey: a nationwide home-based study in adults. J Headache Pain. 2012;13:147–57.

11. Tonini MC, Giordano L, Atzeni L, Bogliun G, Perri G, Saracco MG, et al. Primary headache and epilepsy: a multicentercross sectional study. Epilepsy Behav. 2012;23:342–7.
12. Vercueil, L. “Migralepsy, what it is and what it is not,” Revue Neurologique, 2022;178;654–8.
13. Bauer PR, CarpayJA, Terwindt GM, Sander JW, Thijs RJ, Haan J, et al. Headache and epilepsy. Current pain and headache reports. 2013;17:1-9.
14. Anderman F. Clinical features of migraine–epilepsy syndrome. In: Andermann F, Lugaresi E, editors. Migraine and epilepsy. Boston: Butterworth; 1987.20-89.
15. Garg D, Tripathi M. Borderlands of Migraine and Epilepsy. Neurol India [serial online] 2021;69:91-7.
16. Bianchin MM, LonderoRG, Lima JE, Bigal ME. Migraine and epilepsy: a focus on overlapping clinical, pathophysiological, molecular, and therapeutic aspects. Curr Pain Headache Rep. 2010;14:276–83.
17. Verrotti A, Striano P, Belcastro V, Matricardi S, Villa MP, Parisi P. Migralepsy and related conditions: advances in pathophysiology and classification. Seizure. 2011;20:271-5.
18. Cozzolino O, Marchese M, Trovato F, Pracucci E, Ratto GM, Buzzi MG, et al. Understanding spreading depression from headache to sudden unexpected death. Frontiers in neurology. 2018;9:19.
19. Gotra P, Bhardwaj N, Ludhiadch A, Singh G, Munshi A. Epilepsy and migraine shared genetic and molecular mechanisms: Focus on therapeutic strategies. MolNeurobiol. 2021;58:3874–83.
20. W B, Khalil A, Gallagher MJ, Macdonald RL. Epilepsies. In: Bradley and Daroff's neurology in Clinical Practice, 2-volume set. 8th ed. S.l.: ELSEVIER - HEALTH SCIENCE; 2021;1614–9.

21. ICHD-3. 2021. The International Classification of Headache Disorders - ICHD-3. Available at: <https://ichd-3.org/> [Accessed 27 July 2021].
22. Demarquay G, Moisset X, Lantéri-Minet M, de Gaalon S, Donnet A, Giraud P, et al. Revised guidelines of the French Headache Society for the diagnosis and management of migraine in adults. Part 1: Diagnosis and assessment. Revue Neurologique. 2021;177:725-33.
23. Gowers, W.R. "Clinical lectures on the borderland of epilepsy. iii.--migraine," BMJ, 1906;2;1617–22.
24. Lennox WG, Lennox-Buchthal MA. Epilepsy and Related Disorders. Vol 1. Boston: Little, Brown; 1960.
25. Kim, D.W. and Lee, S.K. "Headache and Epilepsy," Journal of Epilepsy Research,2017;7;7–15.
26. Cozzolino O, Marchese M, Trovato F, Pracucci E, Ratto GM, Buzzi MG, Sicca F, Santorelli FM. Understanding spreading depression from headache to sudden unexpected death. Frontiers in neurology. 2018 Feb 1;9:19.
27. Charles, A. and Brennan, K.C. "Cortical spreading depression—new insights and persistent questions," Cephalalgia,2009;29;1115–24.
28. Kramer DR, Fujii T, Ohiorhenuan I, Liu CY. Interplay between cortical spreading depolarization and seizures. Stereotactic and functional neurosurgery. 2017;95:1-5.
29. Jasim SA, Al-Obaidy AM, Rabeea AK. Relationship of migraine in epileptic patients. Al-Kufa Univ J Biol. 2019;11:14-9.
30. Chovatiya, H.,Yajnik, K. and Desai, S. "Prevalence of headache disorders in patients living with epilepsy in rural region in western part of India," Epilepsy &Behavior, 2023;139;109063.
31. AtalarAÇ, Türk BG, Ekizoglu E, Kurt Gök D, Baykan B, Özge A, et al. Headache in idiopathic/genetic epilepsy: Cluster analysis in a large cohort. Epilepsia. 2022;63:1516-29.
32. Amiri P, Kazeminasab S, Nejadghaderi SA, Mohammadinasab R, Pourfathi H, Araj-Khodaei M, et al. Migraine: a review on its history,

global epidemiology, risk factors, and comorbidities. Frontiers in Neurology. 2022:2553.

33. Lemos C, Alonso I, Barros J, Sequeiros J, Pereira-Monteiro J, Mendonça D, et al. Assessing Risk Factors for Migraine: Differences in Gender Transmission. Forloni G, editor. PLoS ONE. 2012;7:e50626.
34. Ray BK, Paul N, Hazra A, Das S, Ghosal MK, Misra AK et al. Prevalence, burden, and risk factors of migraine: A community-based study from Eastern India. Neurology India. 2017;65:1280.
35. Eric SN, Labodi LD, Meda B, Patrick KRM, Moumouni K, Christian N, et al. Risk factors and treatment for migraine in adults in Ouagadougou: A cross-sectional survey. J Public Health Epidemiol. 2021;13:282–7.
36. Waldie KE, Thompson JM, Mia Y, Murphy R, Wall C, Mitchell EA. Risk factors for migraine and tension-type headache in 11 year old children. J Headache Pain. 2014;15:60.
37. Schiller K, Rauchenzauner M, Avidgor T, Hannan S, Lorenzen C, Kaml M, et al. Primary headache types in adult epilepsy patients. EurJ Med Res. 2023;28:49.
38. Wang X-Q, Lang S-Y, He M-W, Zhang X, Zhu F, Dai W, et al. High prevalence of headache in patients with epilepsy. J Headache Pain. 2014;15:70.
39. Kelley SA, Hartman AL, Kossoff EH. Comorbidity of migraine in children presenting with epilepsy to a tertiary care center. Neurology. 2012;79:468–73.
40. Yıldırım M, Bektaş Ö, AkıncıGöktaş Ö, Yüksel MF, Şahin S, TıraşTeber S. Levetiracetammonotherapy in children with epilepsy: Experience from a tertiary pediatric neurology center. Epilepsy &Behavior. 2021;116:107745.
41. Richens A, Davidson DL, Cartlidge NE, Easter DJ. A multicentre comparative trial of sodium valproate and carbamazepine in adult

onset epilepsy. Adult Epiteg Collaborative Group.Journal of Neurology, Neurosurgery & Psychiatry. 1994;57:682–7.

42. Glauser TA, Dlugos DJ, Dodson WE, Grinspan A, Wang S, Wu S-C. Topiramatemonotherapy in newly diagnosed epilepsy in children and adolescents. Journal of Child Neurology. 2007;22:693–9.
43. Beydoun A, Sachdeo RC, Rosenfeld WE, Krauss GL, Sessler N, Mesenbrink P, et al. Oxcarbazepinemonotherapy for partial-onset seizures. Neurology. 2000;54:2245–51.
44. Gilliam F, Vazquez B, SackellaresJC, Chang GY, Messenheimer J, Nyberg J, et al. An active-control trial of lamotriginemonotherapy for partial seizures. Neurology. 1998;51:1018–25.
45. Scheffer, I., Berkovic, S., Capovilla, G., Connolly, M., French, J., Guilhoto, L..ILAE classification of the epilepsies: Position paper of the ILAE Commission for Classification and Terminology. Epilepsia, 2017;58;512-21.
46. Amudhan S, Gururaj G, Satishchandra P. Epilepsy in India I: Epidemiology and public health. Ann Indian AcadNeurol. 2015;18:263–77.
47. Koul R, Razdan S, Motta A. Prevalence and pattern of epilepsy (Lath/Mirgi/Laran) in rural Kashmir, India. Epilepsia. 1988;29:116–22.
48. Sridharan R, Murthy BN. Prevalence and pattern of epilepsy in India. Epilepsia. 1999;40:631–6.
49. Radhakrishnan K, Pandian JD, Santhoshkumar T, Thomas SV, Deetha TD, Sarma PS, et al. Prevalence, knowledge, attitude, and practice of epilepsy in Kerala, South India. Epilepsia. 2000;41:1027–35.
50. Amudhan S, Gururaj G, Satishchandra P. Epilepsy in India I: Epidemiology and public health. Annals of Indian Academy of Neurology. 2015;18:263-77.
51. HELP Study Group. Multi-center study on migraine and seizure-related headache in patients with epilepsy. Yonsei Med J. 2010;51:219–24.

52. Schiller K, Rauchenzauner M, Avidgor T, Hannan S, Lorenzen C, Kaml M, et al. Primary headache types in adult epilepsy patients. EurJ Med Res. 2023;28:49.

Sr. no	MRD. No	Age	Gender	Marital status	Occupation	Socioeconomic status	H/o epilepsy	Seizure semiology	History of migraine	Triggering factors for migraine									
										Stress	Hormonal fluctuation	Food deprivation	Weather fluctuation	Sleep deprivation	Perfume or odours	Bright lights	Alcohol	Exercise	Any other
1	1209056	25	F	unmarried	POST MASTER	MIDDLE CLASS	Y	B/L TONIC CLONIC	Y	Y	N	N	N	N	N	N	N	N	N
2	1212790	17	M	unmarried	STUDENT	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
3	1214933	16	M	unmarried	STUDENT	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
4	159258	31	F	married	PRIVATE JOB	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
5	1219398	13	F	unmarried	STUDENT	MIDDLE CLASS	Y	FOCAL SEIZURE	N	N	N	N	N	N	N	N	N	N	N
6	1228994	15	M	unmarried	STUDENT	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
7	1243532	18	M	unmarried	STUDENT	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
8	1402022	38	F	married	HOUSEWIFE	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
9	1231756	17	M	unmarried	STUDENT	MIDDLE CLASS	N	MYOCLONIC	N	N	N	N	N	N	N	N	N	N	N
10	777889	14	F	unmarried	STUDENT	LOWER CLASS	N	MYOCLONIC	N	N	N	N	N	N	N	N	N	N	N
11	1256468	15	F	unmarried	STUDENT	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
12	1260727	14	M	unmarried	STUDENT	UPPER CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
13	12444962	12	M	unmarried	STUDENT	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
14	1249605	25	F	married	HOUSEWIFE	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
15	1214820	40	M	married	PRIVATE JOB	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
16	1296773	18	M	unmarried	STUDENT	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
17	1297114	15	F	unmarried	STUDENT	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
18	1255978	33	F	married	HOUSEWIFE	LOWER CLASS		B/L TONIC CLONIC	Y	Y	N	Y	N	Y	Y	N	N	N	N
19	1304296	31	M	married	FARMER	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
20	1303702	15	F	unmarried	STUDENT	MIDDLE CLASS	N	MYOCLONIC	N	N	N	N	N	N	N	N	N	N	N
21	1308014	14	F	unmarried	STUDENT	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
22	1292171	18	M	unmarried	SELF EMPLOYED	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
23	1326711	19	F	unmarried	STUDENT	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
24	1321330	12	F	unmarried	STUDENT	LOWER CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
25	1324802	9	M	unmarried	STUDENT	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
26	1312008	14	M	unmarried	STUDENT	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
27	1324063	15	M	unmarried	STUDENT	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
28	1314315	13	F	unmarried	STUDENT	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
29	1309508	8	M	unmarried	STUDENT	UPPER CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
30	1320133	13	M	unmarried	STUDENT	LOWER CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
31	1319351	24	M	unmarried	STUDENT	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
32	1319314	23	M	unmarried	PRIVATE JOB	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
33	1243212	11	M	unmarried	STUDENT	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
34	1299200	27	F	married	HOUSEWIFE	MIDDLE CLASS	Y	MYOCLONIC	Y	Y	N	N	Y	N	N	Y	N	N	SOUND/ LIGHT
35	1329222	17	F	unmarried	STUDENT	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
36	1270468	28	M	married	PRIVATE JOB	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
37	1332114	18	M	unmarried	STUDENT	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
38	1334241	23	F	married	HOUSEWIFE	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
39	1342359	22	M	unmarried	BUISNESS	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
40	1353536	23	M	unmarried	PRIVATE JOB	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
41	1254101	11	M	unmarried	STUDENT	LOWER CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
42	1336364	31	F	married	HOUSEWIFE	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
43	1403939	17	M	unmarried	STUDENT	UPPER CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
44	1411041	40	F	married	HOUSEWIFE	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
45	1420337	16	M	unmarried	STUDENT	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
46	1410905	30	F	married	HOUSEWIFE	MIDDLE CLASS	Y	B/L TONIC CLONIC	Y	Y	N	Y	N	Y	Y	Y	N	N	TRAVELLING
47	1458861	22	M	unmarried	STUDENT	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
48	1031774	36	F	married	HOUSEWIFE	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
49	1242566	27	F	married	HOUSEWIFE	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
50	1378024	23	F	unmarried	STAFF NURSE	MIDDLE CLASS	Y	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
51	57395	10	F	unmarried	STUDENT	MIDDLE CLASS	N	B/L TONIC CLONIC	N	N	N	N	N	N	N	N	N	N	N
52	1448885	15	M	unmarried	STUDENT	MIDDLE CLASS	N	FOCAL SEIZURE	N	N	N	N	N	N	N	N	N	N	N

Sr. no	MRD. No	Age	Risk factors for Migraine				Family history of Epilepsy	Migraine	Any other	Past history	BMI	General Physical			Systemic Examination				Name of the drug
			Family history	Obesity	Oral contraceptive use	Any other						Height	Weight	BP	CNS	CVS	Respiratory	Abdomen	
1	1209056	25	N	N	N	N	N	N	N	N	20.4	64 INCH	54	120/90	NAD	NAD	NAD	NAD	LEVERTIRACETAM
2	1212790	17	N	N	N	N	N	N	N	N	18.8	68 INCH	56	130/80	NAD	NAD	NAD	NAD	VALPROATE
3	1214933	16	N	Y	N	N	N	N	N	N	25.1	69 INCH	77	116/70	NAD	NAD	NAD	NAD	VALPROATE
4	159258	31	N	N	N	N	N	N	N	N	19	62 INCH	47	130/90	NAD	NAD	NAD	NAD	LEVERTIRACETAM
5	1219398	13	N	N	N	N	N	N	N	N	21.7	61 INCH	52	100/70	NAD	NAD	NAD	NAD	VALPROATE
6	1228994	15	N	N	N	N	N	N	N	N	19.1	71 INCHES	62	130/80	NAD	NAD	NAD	NAD	LEVERTIRACETAM
7	1243532	18	N	N	N	N	Y	N	N	N	19	70 INCHES	60	130/70	NAD	NAD	NAD	NAD	LEVERTIRACETAM
8	1402022	38	N	N	N	N	N	N	N	N	24.9	65 INCHES	68	126/74	NAD	NAD	NAD	NAD	LEVERTIRACETAM
9	1231756	17	N	N	N	N	Y	N	N	N	20.8	68 INCHES	62	120/70	NAD	NAD	NAD	NAD	VALPROATE
10	777889	14	N	N	N	N	N	N	N	N	21.4	59 INCHS	48	126/64	NAD	NAD	NAD	NAD	VALPROATE
11	1256468	15	N	N	N	N	N	Y	N	N	27.6	58 INCHS	60	120/76	NAD	NAD	NAD	NAD	LEVERTIRACETAM
12	1260727	14	N	N	N	N	N	N	N	ASTHMA	19.4	60 INCHS	45	120/86	NAD	NAD	NAD	NAD	VALPROATE
13	12444962	12	N	N	N	N	N	N	N	N	19.8	60 INCHS	46	100/66	NAD	NAD	NAD	NAD	VALPROATE
14	1249605	25	N	Y	N	N	N	N	N	N	31.2	63 INCHES	80	120/70	NAD	NAD	NAD	NAD	LEVERTIRACETAM
15	1214820	40	N	N	N	N	N	N	N	N	22.9	52 INCHES	40	130/80	NAD	NAD	NAD	NAD	PHENYTOIN
16	1296773	18	N	N	N	N	N	N	N	N	19	70 INCHES	60	130/80	NAD	NAD	NAD	NAD	LEVERTIRACETAM
17	1297114	15	N	N	N	N	Y	N	N	N	19.1	65 INCHES	52	100/60	NAD	NAD	NAD	NAD	LEVERTIRACETAM
18	1255978	33	N	N	N	N	Y	N	N	N	22	65 INCHES	60	130/80	NAD	NAD	NAD	NAD	VALPROATE
19	1304296	31	N	N	N	N	N	N	FATHER HAS HTN	N	24	71 INCHES	78	130/70	NAD	NAD	NAD	NAD	PHENYTOIN
20	1303702	15	N	N	N	N	N	N	N	N	22.7	65 INCHES	62	110/80	NAD	NAD	NAD	NAD	LEVERTIRACETAM
21	1308014	14	N	N	N	N	N	N	GRAND MOTHER HAS DIABETES, HTN	N	20.2	62INCHES	50	108/80	NAD	NAD	NAD	NAD	LEVERTIRACETAM
22	1292171	18	N	N	N	N	N	N	FATHER HAS DIABETES	N	20.7	67 INCHES	60	120/80	NAD	NAD	NAD	NAD	LEVERTIRACETAM
23	1326711	19	N	N	N	N	N	N	N	N	29.8	62 INCHES	74	120/70	NAD	NAD	NAD	NAD	LEVERTIRACETAM
24	1321330	12	N	N	N	N	N	N	N	N	20.2	60 INCHES	47	110/70	NAD	NAD	NAD	NAD	LEVERTIRACETAM
25	1324802	9	N	N	N	N	N	Y	N	N	29.6	48 INCHES	44	126/60	NAD	NAD	NAD	NAD	LEVERTIRACETAM
26	1312008	14	N	N	N	N	N	N	FATHER HAS DIBETES	N	20.2	62 INCHES	50	110/76	NAD	NAD	NAD	NAD	VALPROATE
27	1324063	15	N	N	N	N	N	N	N	N	21.5	71 INCHES	70	120/80	NAD	NAD	NAD	NAD	VALPROATE
28	1314315	13	N	N	N	N	N	N	N	N	20.9	59 INCHS	47	110/60	NAD	NAD	NAD	NAD	LEVERTIRACETAM
29	1309508	8	N	N	N	N	Y	N	N	N	19.1	45 INCHES	25	100/60	NAD	NAD	NAD	NAD	CARBAMZEPINE
30	1320133	13	N	N	N	N	Y	Y	N	N	19.6	55 INCHES	38.3	130/80	NAD	NAD	NAD	NAD	LEVERTIRACETAM
31	1319351	24	N	N	N	N	N	N	FATHER HAS HTN	N	23.1	66 INCHES	65	130/80	NAD	NAD	NAD	NAD	LEVERTIRACETAM
32	1319314	23	N	N	N	N	N	N	FATHER HAS DIABETES	N	25.9	67 INCHES	75	110/80	NAD	NAD	NAD	NAD	VALPROATE 500 MG
33	1243212	11	N	N	N	N	N	N	N	N	24.5	60 INCHES	57	95/64	NAD	NAD	NAD	NAD	VALPROATE
34	1299200	27	Y MOTHER	N	N	N	N	Y	N	N	29	62 INCHES	72	110/70	NAD	NAD	NAD	NAD	LEVERTIRACETAM
35	1329222	17	N	N	N	N	N	N	N	N	19.2	66 INCHES	54	110/70	NAD	NAD	NAD	NAD	LEVERTIRACETAM
36	1270468	28	N	N	N	N	N	N	N	N	26.8	68 INCHES	80	130/80	NAD	NAD	NAD	NAD	CARBAMZEPINE
37	1332114	18	N	N	N	N	N	N	N	N	21.8	72 INCHES	73	130/70	NAD	NAD	NAD	NAD	VALPROATE
38	1334241	23	N	N	N	N	N	N	N	N	23.1	66 INCHES	65	130/80	NAD	NAD	NAD	NAD	LEVERTIRACETAM
39	1342359	22	N	N	N	N	N	N	UNCLE HAS DIABETES	N	22.8	66 INCHES	64	110/70	NAD	NAD	NAD	NAD	VALPROATE
40	1353536	23	N	N	N	N	N	N	N	N	30.1	60 INCHES	70	110/50	NAD	NAD	NAD	NAD	LEVERTIRACETAM
41	1254101	11	N	N	N	N	N	N	N	N	23.2	59 INCHES	52	100/60	NAD	NAD	NAD	NAD	LEVERTIRACETAM
42	1336364	31	N	N	N	N	N	N	N	N	24.9	66 INCHES	70	110/80	NAD	NAD	NAD	NAD	LEVERTIRACETAM
43	1403939	17	N	N	N	N	N	N	N	N	33.8	65 INCHES	92	120/80	NAD	NAD	NAD	NAD	CARBAMZEPINE
44	1411041	40	N	N	N	N	N	N	N	N	23.5	68 INCHES	70	130/80	NAD	NAD	NAD	NAD	LEVERTIRACETAM
45	1420337	16	N	N	N	N	N	N	N	N	27.6	67 INCHES	80	120/80	NAD	NAD	NAD	NAD	LEVERTIRACETAM
46	1410905	30	N	N	N	N	N	N	N	N	25.4	64 INCHES	67	110/70	NAD	NAD	NAD	NAD	LEVERTIRACETAM
47	1458861	22	N	N	N	N	N	N	N	N	24.1	68 INCHES	72	110/80	NAD	NAD	NAD	NAD	VALPROATE
48	1031774	36	N	N	N	N	N	N	N	N	21.2	64 INCHES	56	90/70	NAD	NAD	NAD	NAD	VALPROATE
49	1242566	27	N	N	N	N	Y	N	N	N	20.2	65 INCHES	55	130/80	NAD	NAD	NAD	NAD	LEVERTIRACETAM
50	1378024	23	N	N	N	N	N	N	N	N	25.7	65 INCHES	70	110/80	NAD	NAD	NAD	NAD	LEVERTIRACETAM
51	57395	10	N	N	N	N	N	N	N	N	19	54 INCHES	36	110/70	NAD	NAD	NAD	NAD	CARBAMZEPINE
52	1448885	15	N	N	N	N	N	N	N	N	19.4	67 INCHES	56	120/70	NAD	NAD	NAD	NAD	VALPROATE

Sr. no	MRD. No	Age	DRUG DOSE TITRATION DIARY			MIGRAINE	Total Episodes of Migraine	Baseline HIT 6	HIT 6 AFTER ASM
			MAXIMUM DOSE	Frequency	Adverse drug reaction				
1	1209056	25	750 MG	B.D	Sedation	Y	4	47	47
2	1212790	17	200 MG	B.D	WEIGHT GAIN	N	0	0	0
3	1214933	16	300MG	B.D	NONE	N	0	0	0
4	159258	31	750 MG	B.D	NONE	N	0	0	0
5	1219398	13	300MG	B.D	NONE	N	0	0	0
6	1228994	15	500 MG	B.D	NONE	Y	6	0	54
7	1243532	18	500 MG	B.D	NONE	N	0	0	0
8	1402022	38	500 MG	B.D	NONE	N	0	0	0
9	1231756	17	500 MG	B.D	NONE	N	0	0	0
10	777889	14	300 MG	B.D	NONE	Y	16	0	55
11	1256468	15	750 MG	B.D	NONE	N	0	0	0
12	1260727	14	300-500	B.D	ATAXIA	N	0	0	0
13	12444962	12	300 MG	B.D	NONE	N	0	0	0
14	1249605	25	1000MG	B.D	NON MIGRANOUS HEADACHE	N	0	0	0
15	1214820	40	100 MG	B.D	NONE	N	0	0	0
16	1296773	18	750 MG	B.D	NONE	N	0	0	0
17	1297114	15	750 MG	B.D	NONE	N	0	0	0
18	1255978	33	500 MG	B.D	NONE	Y	12	47	49
19	1304296	31	150-200 MG	B.D	NONE	N	0	0	0
20	1303702	15	750 MG	B.D	NONE	N	0	0	0
21	1308014	14	500 MG	B.D	NONE	Y	7	0	42
22	1292171	18	750 MG	B.D	NONE	N	0	0	0
23	1326711	19	750 MG	B.D	NONE	N	0	0	0
24	1321330	12	500 MG	B.D	NONE	N	0	0	0
25	1324802	9	250 MG	B.D	NONE	N	0	0	0
26	1312008	14	400 MG	B.D	NONE	N	0	0	0
27	1324063	15	400 MG	B.D	NONE	N	0	0	0
28	1314315	13	1000 MG	B.D	NONE	N	0	0	0
29	1309508	8	100 MG	TDS	NONE	N	0	0	0
30	1320133	13	500 MG	B.D	NONE	N	0	0	0
31	1319351	24	500MG	B.D	NONE	N	0	0	0
32	1319314	23		B.D	NONE	N	0	0	0
33	1243212	11	400 MG	B.D	NONE	N	0	0	0
34	1299200	27	750 MG	B.D	SEDATION	Y	9	58	51
35	1329222	17	750 MG	B.D	NONE	Y	6	0	46
36	1270468	28	300 MG	B.D	NON MIGRANOUS HEADACHE	N	0	0	0
37	1332114	18	400 MG	B.D	NONE	N	0	0	0
38	1334241	23	750 MG	B.D	NONE	N	0	0	0
39	1342359	22	500 MG	B.D	NONE	N	0	0	0
40	1353536	23	750 MG	B.D	NONE	N	0	0	0
41	1254101	11	250-125 MG	B.D	NONE	N	0	0	0
42	1336364	31	500- 750 MG	B.D	NONE	N	0	0	0
43	1403939	17	400 MG	B.D	NONE	N	0	0	0
44	1411041	40	750 MG	B.D	NONE	N	0	0	0
45	1420337	16	500 MG	B.D	NONE	Y	6	0	40
46	1410905	30	750 MG	B.D	NONE	Y	19	56	56
47	1458861	22	300-500 MG	B.D	N0NE	N	0	0	0
48	1031774	36	300 MG	B.D	NONE	N	0	0	0
49	1242566	27	750 MG	B.D	NONE	N	0	0	0
50	1378024	23	750 MG	B.D	SEDATION	N	0	0	0
51	57395	10	200 MG	B.D	NONE	N	0	0	0
52	1448885	15	300 MG	B.D	AGGRESSIVE MOOD	N	0	0	0

Email : Examinationcell@bfuhs.ac.in

No. BFUHS/2K21p-III/ 12 Date 24/11/21

The Principal,
DMC, Ludhiana.

Subject: **Approval of Plan of Thesis.**

This is to inform you that the Faculty of Medical Sciences in its meeting held on 29.10.2021 has approved the plan of thesis of **Saurabh Sultania**, a student of your college for **DM Neurology** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis
Risk factors for migraine in people with epilepsy.

Supervisor
Dr. Gagandeep Singh
Prof. & Head,
Dept. of Neurology,
DMCH, Ludhiana.

Co-Supervisor

Dr. Monika Singla
Assoc. Prof.,
Dept. of Neurology,
DMCH, Ludhiana.

Dr. Jatinder Singh Goraya
Prof.,
Dept. of Paediatrics,
DMCH, Ludhiana.

The student has to submit the four copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

173. If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.

174. The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.

RISK FACTORS FOR MIGRAINE IN PEOPLE WITH EPILEPSY

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

Doctorate of Medicine

in

Neurology

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

AUGUST, 2021

Dr. Saurabh Sultania

DEPARTMENT OF NEUROLOGY
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA

ABSTRACT OF PLAN OF THESIS

Title	RISK FACTORS FOR MIGRAINE IN PEOPLE WITH EPILEPSY.
For the degree of	D.M Neurology
Name of the candidate	Dr. Saurabh Sultania
Supervisor	Dr. Gagandeep Singh, Professor, Department of Neurology, DMCH, Ludhiana
Co-supervisors	Dr. Monika Singla, Associate Professor, Department of Neurology, DMCH, Ludhiana Dr J.S Goraya, Professor Pediatric Neurology, DMCH, Ludhaina
Institution	Dayanand Medical College & Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction: Epilepsy and headache are common neurological problems seen in neurological practice. Cortical spreading depression is thought to be the link between migraine and epilepsy. A systematic review and meta-analysis of population-based studies examined the lifetime relative prevalence of migraine among persons with epilepsy and vice versa. It was observed that in comparison with people without epilepsy, patients with epilepsy harbored 52% increased migraine prevalence, with a prevalence ratio of 1.52. It is presently unclear that what are the risk factors for migraine in people with new onset epilepsy. So the present study is aimed to know what are the risk factors for migraine in people with epilepsy.

Aim of Study: To determine the risk factors for migraine in people with new onset epilepsy.

Material & Methods: This study will be conducted in the new onset epilepsy patients with headache, attending neurology OPD. Patients with idiopathic generalized and focal epilepsy will be enrolled. Patients will be started on monotherapy of AEDs and once on maintenance dose follow up will be done for 3 months. Patients with non epileptic seizures and those who are on polytherapy will be excluded. The data from each patient will be entered on a preformed Performa.

Clinical Significance: This study will help to determine the risk factors for migraine in patients with new onset epilepsy.

Keywords: Epilepsy, Migraine.

(Signature)	(Signature)	(Signature)	(Signature)	(Signature)
Candidate	Co-supervisor	Co- supervisor	Supervisor	Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis entitled "**RISK FACTORS FOR MIGRAINE IN PEOPLE WITH EPILEPSY**" exist in the Department of Neurology, Dayanand Medical College & Hospital, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis are genuine and is collected by the candidate himself under our supervision and guidance.

Supervisors

Dr. Gagandeep singh
Professor & Head
Department of Neurology
DMCH, Ludhiana

Co-Supervisors

Dr. Monika Singla
Associate Professor
Department of Neurology
DMCH, Ludhiana

Dr. J. S Goraya
Professor
Department of Pediatric Neurology
DMCH, Ludhiana

Head of the Department

Dr. Gagandeep Singh
Professor & Head
Department of Neurology
DMCH, Ludhiana

Place: _____

Date: _____

APPROVAL PROFORMA
BY RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

Name of candidate	Dr. SAURABH SULTANIA
Department	Neurology
Topic of Thesis	RISK FACTORS FOR MIGRAINE IN PEOPLE WITH EPILEPSY.
Likely date of appearing in PG examination	DECEMBER, 2023
Date of enrollment	19/12/2020
Name of Head of Department	Dr. Gagandeep Singh
1) Supervisor **2) Co-Supervisor(s)**	Dr. Gagandeep Singh Dr. Monika Singla Dr J.S Goraya
Signature of Members of Research Committee with Stamp	**Signature of Members of Ethics Committee with Stamp**
Dr. Harpreet Kaur (Professor & Head, Pathology)	Mr. R K Sharma (Legal Expert)
Dr. Jaspal Singh (Professor & Head, Surgery)	Dr. Ramit Mahajan (Associate Professor, Gastroenterology)
Dr. Dinesh Gupta (Professor & Head, Medicine)	Dr. Anu Sharma (Professor, Anatomy)
Dr. Sandeep Kaushal (Dean Academics & Professor & Head, Pharmacology)	Dr. Sandeep Kaushal (Dean Academics & Professor & Head, Pharmacology)
Dr. Gurpreet S Wander (Vice Principal)	Dr. Gurpreet S Wander (Vice Principal & Professor & Head, Cardiology)
	Dr. Gagandeep Singh (Secretary, Ethics Committee Professor & Head, Neurology)

Approved: Yes / No

Dr. Sandeep Puri
Chairperson
Research Committee
Chairperson
Research Committee

Approved: Yes / ~~No~~

Prof. Arvind Malhotra
Chairperson
Ethics Committee
Chairperson
Ethics Committee

BABA FARID UNIVERSITY OF HEALTH SCIENCES, FARIDKOT

PERFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	Dr. SAURABH SULTANIA
2	NAME OF THE INSTITUTE	DAYANAND MEDICAL COLLEGE AND HOSPITAL LUDHIANA
3	COURSE OF STUDY AND SUBJECT	DM NEUROLOGY
4	DATE OF ADMISSION OF COURSE	19-12-2020
5	TITLE OF THE TOPIC	RISK FACTORS FOR MIGRAINE IN PEOPLE WITH EPILEPSY.

6.0 BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Epilepsy and headache are common neurological problems seen in neurological practice. The relationship between migraine and epilepsy is yet to be resolved.[1]

Sir William Richard Gowers had first proposed the hypothesis that headache and epilepsy are related. He suggested that these two diseases share many pathophysiological mechanisms.[2]

Epilepsy and migraine can be considered interrelated, as both are characterized by transient paroxysmal episodes of altered brain function. Also there is a considerable pathophysiological, clinical and therapeutic overlap seen in these disorders.[3]

Cortical spreading depression is thought to be the link between migraine and epilepsy.[4-7]

ILAE defines epilepsy by at least two unprovoked seizures occurring more than 24 h apart or a single unprovoked seizure with a recurrence risk of at least 60% over the next 10 years or an identifiable epileptic syndrome.[8]

As per WHO around 50 million people worldwide have epilepsy and nearly 80% of people with epilepsy live in low- and middle-income countries.[9]

In a recent metanalysis the pooled prevalence of epilepsy in india was found to be 4.7 per 1,000 population.[10]

Worldwide, an active headache disorder is reported in about 46% of the population. Overall, migraine represents about 11% of headache. Chronic daily headache is seen in 3%, and tension-type headache is seen in 42%.[11]

Headache is an under-recognized and under-treated symptom in persons with epilepsy (PWE). Interictal and postictal headaches are common in patients with epilepsy. Migraine is the dominant phenotype of interictal and postictal headaches.[11]

A systematic review and meta-analysis of population-based studies examined the lifetime relative prevalence of migraine among persons with

epilepsy and vice versa. It was observed that in comparison with people without epilepsy, patients with epilepsy harbored 52% increased migraine prevalence, with a prevalence ratio of 1.52.[12]

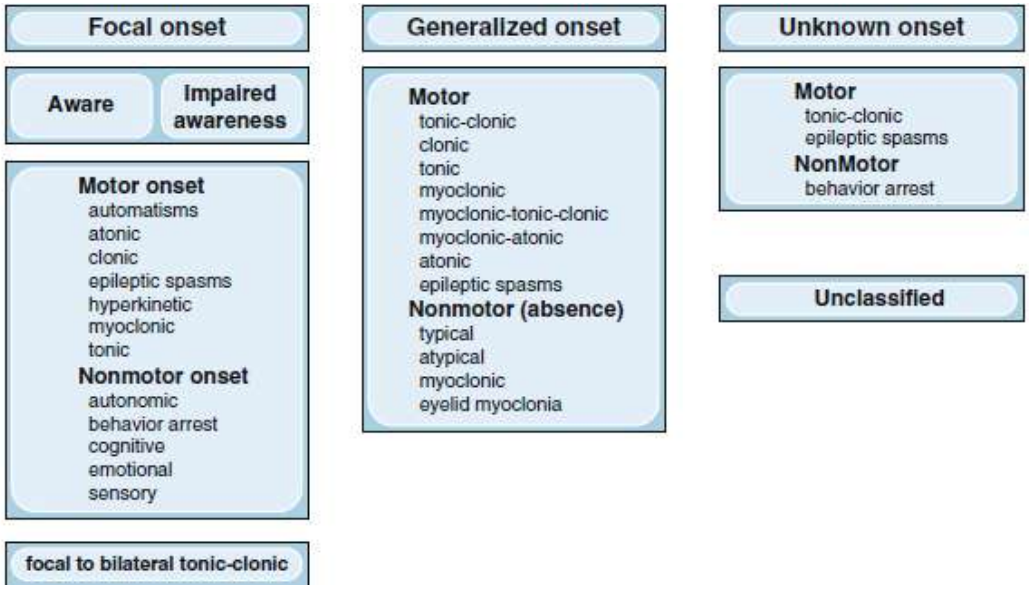
It is presently unclear that what are the risk factors for migraine in people with new onset epilepsy.

So the present study is aimed to know what are the risk factors for migraine in people with epilepsy.

6.2 REVIEW OF LITERATURE

Currently epilepsy is defined as per ILAE definition by at least two unprovoked seizures occurring more than 24 h apart or a single unprovoked seizure with a recurrence risk of at least 60% over the next 10 years or an identifiable epileptic syndrome.[8]

ILAE 2017 Classificiation of SEIZURES[13]



Individuals with generalized epilepsy may have a range of seizure types including absence, myoclonic, atonic, tonic, tonic clonic seizures. These individuals typically show spike wave discharge on EEG. The diagnosis of generalized epilepsy is usually clinical, supported by findings of typical interictal EEG discharges. Idiopathic generalized epilepsies(IGEs) is a common subgroup of generalized epilepsy. IGEs encompass four well established epilepsy syndromes: Childhood Absence Epilepsy, Juvenile Absence Epilepsy, Juvenile Myoclonic Epilepsy, Generalized Tonic Clonic Seizures Alone.

Focal epilepsies include unifocal and multifocal disorders as well as seizures involving one hemisphere. There are many self limited focal epilepsies including self limited epilepsy with centrotemporal spikes, self

limited occipital epilepsies of the childhood, other self limited frontal temporal and parietal lobe epilepsies.[14]

Migraine is classified and defined as per ICHD 3 criteria[15]

1. Migraine
1.1 Migraine without aura
1.2 Migraine with aura
1.2.1 Migraine with typical aura
1.2.1.1 Typical aura with headache
1.2.1.2 Typical aura without headache
1.2.2 Migraine with brainstem aura
1.2.3 Hemiplegic migraine
1.2.3.1 Familial hemiplegic migraine (FHM)
1.2.3.1.1 Familial hemiplegic migraine type 1 (FHM1)
1.2.3.1.2 Familial hemiplegic migraine type 2 (FHM2)
1.2.3.1.3 Familial hemiplegic migraine type 3 (FHM3)
1.2.3.1.4 Familial hemiplegic migraine, other loci
1.2.3.2 Sporadic hemiplegic migraine (SHM)
1.2.4 Retinal migraine
1.3 Chronic migraine
1.4 Complications of migraine
1.4.1 Status migrainosus
1.4.2 Persistent aura without infarction
1.4.3 Migrainous infarction
1.4.4 Migraine aura-triggered seizure
1.5 Probable migraine
1.5.1 Probable migraine without aura
1.5.2 Probable migraine with aura
1.6 Episodic syndromes that may be associated with migraine
1.6.1 Recurrent gastrointestinal disturbance
1.6.1.1 Cyclical vomiting syndrome

1.6.1.2 Abdominal migraine

1.6.2 Benign paroxysmal vertigo

1.6.3 Benign paroxysmal torticollis

(1) Migraine without aura

A. At least five attacks fulfilling criteria B-D

B. Headache attacks lasting 4-72 hours (when untreated or unsuccessfully treated)

C. Headache has at least two of the following **four** characteristics:

1) Unilateral location

2) Pulsating quality

3) Moderate or severe pain intensity

4) Aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)

D. During headache at least one of the following:

1) Nausea and/or vomiting

2) Photophobia and phonophobia

Not better accounted for by another ICHD-3 diagnosis.

(2) Migraine with aura

A. At least two attacks fulfilling criteria B and C

B. One or more of the following fully reversible aura symptoms:

1) Visual

2) Sensory

3) Speech and/or language

4) Motor

5) Brainstem

6) Retinal

C. At least three of the following six characteristics:

1) At least one aura symptom spreads gradually over ≥5 minutes
2) Two or more aura symptoms occur in succession
3) Each individual aura symptom lasts 5-60 minutes
4) At least one aura symptom is unilateral
5) At least one aura symptom is positive
6) The aura is accompanied, or followed within 60 minutes, by headache

D. Not better accounted for by another ICHD-3 diagnosis.

The comorbidity between migraine and epilepsy is well established, but exact relationship is yet to be elucidated.

One proposed mechanism is cortical spreading depression(CSD).

CSD is believed to be a shared event between migraine and epilepsy.

Neocortical hyperexcitability leads to a paroxysmal depolarizing shift in epilepsy.

In patients with migraine, it is believed that neocortical hyperexcitability progressed into CSD.

Neocortical hyperexcitability, in association with genetic and molecular links, is a largely accepted hypothesis underlying both conditions.[16]

Andermann and lugaresi proposed that prevalance of epilepsy in migraineurs substantially exceeds that of general population.[17]

Ottoman and lipton found that incidence of migraine headaches in individuals with epilepsy is nearly twice that of individuals without epilepsy.[18]

Population based study conducted by Keezer et al foundthat in comparison with people without epilepsy, patients with epilepsy harbored 52% increased migraine prevalence, with a prevalence ratio of 1.52.[12]

Jabbhedari S et al evaluated the prevalence of migraine in epileptic patients. One hundred fifty epileptic patients were enrolled, 23 persons had criteria compatible with migraine with aura; 26 patients had migraine without aura. Migraine was more common in persons with academic degrees, women, patients who were used 2 antiepileptic drugs, and patients with high BMI.[19]

6.3 AIMS & OBJECTIVES OF THE STUDY

To determine the risk factors for migraine in people with new onset epilepsy.

7.0 MATERIALS AND METHODS

This will be a cross sectional observational study .All newly diagnosed patients with idiopathic generalized epilepsy and focal epilepsy presenting to Neurology OPDDMCH Ludhiana between 1stAugust 2021 TO April 2023 will be enrolled for study after taking informed and written consent. They will be started on the monotherapy with antiseizure medication (as per choice of neurologist). Assessment will be done over 3 months. Patient demographics along with clinical characteristics such as seizures semiology, type of migraine (severity, disability, frequency and pattern) along with the complete details of the ASM being used by the patient will be recorded. A complete drug history will also be recorded. Along with this they will be asked to maintain headache calendar, which will be collected back at each subsequent visits. Follow up study will be done for 3 months on monthly basis. They will be interviewed for information regarding migraine history.

7.1 SOURCE OF DATA:

Data collection will be done by analyzing the patients with idiopathic generalized epilepsy or focal epilepsy presenting to Neurology OPD Dayanand medical college Ludhiana.

7.2 METHOD OF COLLECTION OF DATA

Any patient who present to DMCH inout patient Neurology clinic meeting the inclusion and exclusion criteria

Inclusion criteria

- Age 7 years or above
- Diagnosis of epilepsy.
- Gender- either.
- Idiopathic generalized epilepsy and focal epilepsy.

Patient on Monotherapy (ASM) on maintenance dose.

Exclusion criteria

- Non consentingindividuals.
- Patients on poly drug therapy.

- Patients with secondary causes of headache such as intracranial tumour's, meningitis, head injury, stroke, acute metabolic cause etc.
- Patients with severe mental retardation.
- Patients with psychogenic, non epileptic seizures.
- Concomitant anxiety and depression.

Method of study:-

Diagnosis of epilepsy will be as per **ILAE**definition as proposed by Fischer et al[20]

Idiopathic generalized and focal epilepsy will be defined as per the criteria proposed by Schefferet al[14]

Migraine will be diagnosed as per **ICHD 3** criteria.[15]

All participants will be screened for migraine at the start of the study then monthly for 3 months once on the maintenance dose of antiseizuremedication(ASM).

They will be asked to fill up headache calendar for 3 months, tension type headache days, will be excluded.

Severity of migraine will be assessed using **HIT 6** Score**,** in english and regional languages.

Anxiety and depression will be ruled out using the **GAD7** and **NDDI-E** scale respectively.

ICHD-3 diagnostic criteria – episodic migraine with/without aura

1.1 Migraine without aura

A. At least 5 attacks fulfilling criteria B–D
B. Headache attacks lasting 4–72 hours (when untreated or unsuccessfully treated)
C. Headache has at least 2 of the following 4 characteristics:
   1. Unilateral location
   2. Pulsating quality
   3. Moderate or severe pain intensity
   4. Aggravation by or causing avoidance of routing physical activity (e.g., walking or climbing stairs)
D. During headache at least 1 of the following:
   1. Nausea and/or vomiting
   2. Photophobia and phonophobia
E. Not better accounted for by another ICHD-3 diagnosis

1.2 Migraine with aura

A. At least 2 attacks fulfilling criteria B and C
B. At least 1 of the following fully reversible aura symptoms:
   1. Visual
   2. Sensory
   3. Speech and/or language
   4. Motor
   5. Brainstem
   6. Retinal
C. At least 3 of the following 6 characteristics:
   1. At least 1 aura symptom spreads gradually over ≥5 minutes
   2. 2 or more aura symptoms occur in succession
   3. Each individual aura symptom lasts 5–60 minutes
   4. At least 1 aura symptom is unilateral
   5. At least 1 aura symptom is positive
   6. The aura is accompanied, or followed within 60 minutes, by headache
D. Not better accounted for by another ICHD-3 diagnosis

HIT-6™
(VERSION 1.1)

HEADACHE IMPACT TEST™

This questionnaire was designed to help you describe and communicate the way you feel and what you cannot do because of headaches.

To complete, please circle one answer for each question.

1 When you have headaches, how often is the pain severe?

Never | Rarely | Sometimes | Very Often | Always

2 How often do headaches limit your ability to do usual daily activities including household work, work, school, or social activities?

Never | Rarely | Sometimes | Very Often | Always

3 When you have a headache, how often do you wish you could lie down?

Never | Rarely | Sometimes | Very Often | Always

4 In the past 4 weeks, how often have you felt too tired to do work or daily activities because of your headaches?

Never | Rarely | Sometimes | Very Often | Always

5 In the past 4 weeks, how often have you felt fed up or irritated because of your headaches?

Never | Rarely | Sometimes | Very Often | Always

6 In the past 4 weeks, how often did headaches limit your ability to concentrate on work or daily activities?

Never | Rarely | Sometimes | Very Often | Always

COLUMN 1 (6 points each)	+	COLUMN 2 (8 points each)	+	COLUMN 3 (10 points each)	+	COLUMN 4 (11 points each)	+	COLUMN 5 (13 points each)
▽		▽		▽		▽		▽

To score, add points for answers in each column.

Please share your HIT-6 results with your doctor.

Total Score ☐

Higher scores indicate greater impact on your life.

Score range is 36-78.

HIT-6™ US (English) Version 1.1
©2000, 2001 QualityMetric, Inc. and GlaxoSmithKline Group of Companies

Hit 6 Punjabi Version

HIT-6™

ਸਿਰਦਰਦ
ਪ੍ਰਭਾਵ ਟੈਸਟ''

(ਸੰਸਕਰਨ 1.1)

ਇਹ ਪ੍ਰਸ਼ਨਾਵਲੀ ਸਿਰਦਰਦਾ ਦੇ ਕਾਰਨ ਜਿਸ ਤਰ੍ਹਾ ਤੁਸੀ ਮਹਿਸੂਸ ਕਰਦੇ ਹੋ ਅਤੇ ਤੁਸੀ ਜੋ ਨਹੀ ਕਰ ਸਕਦੇ ਹੋ ਉਸ ਨੂੰ ਦਰਸਾਉਣ ਅਤੇ ਸੱਧਾਰ ਕਰਨ ਵਿੱਚ ਤੁਹਾਡੀ ਮੱਦਦ ਕਰਨ ਲਈ ਤਿਆਰ ਕੀਤੀ ਗਈ ਹੈ।

ਪੂਰਾ ਕੁਸ਼ਨ ਲਈ, ਕਿਰਪਾ ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਲਈ ਇੱਕ ਉੱਤਰ ਉੱਤੇ ਘੱਕਰ ਲਗਾਉ।

1. **ਜਦੋ ਤੁਹਾਨੂੰ ਸਿਰਦਰਦ ਹੁੰਦਾ ਹੈ, ਕਿੰਨੀ ਵਾਰ ਦਰਦ ਭਿਆਨਕ ਹੁੰਦੀ ਹੈ?**

ਕਦੇ ਨਹੀ ਕਦੇ-ਕਦਾਈ ਕਈ ਵਾਰ ਬਹੁਤ ਵਾਰੀ ਹਮੇਸ਼ਾ

2. **ਕਿੰਨੀ ਵਾਰ ਸਿਰਦਰਦ ਤੁਹਾਡੀ ਰੋਜ਼ਾਨਾ ਗਤੀਵਿਧੀਆਂ ਜਿਹਨਾ ਵਿੱਚ ਘਰੇਲੂ ਕੰਮ, ਕੰਮ, ਸਕੂਲ, ਜਾ ਸਮਾਜਿਕ ਗਤੀਵਿਧੀਆਂ ਸ਼ਾਮਿਲ ਹਨ ਨੂੰ ਕਰਨ ਦੀ ਯੋਗਤਾ ਨੂੰ ਸੀਮਿਤ ਕਰਦਾ ਹੈ?**

ਕਦੇ ਨਹੀ ਕਦੇ-ਕਦਾਈ ਕਈ ਵਾਰ ਬਹੁਤ ਵਾਰੀ ਹਮੇਸ਼ਾ

3 **ਜਦੋ ਤੁਹਾਨੂੰ ਸਿਰਦਰਦ ਹੁੰਦਾ ਹੈ, ਕਿੰਨੀ ਵਾਰ ਤੁਸੀ ਇੱਛਾ ਕੀਤੀ ਕਿ ਤੁਹਾਨੂੰ ਲੇਟ ਜਾਣਾ ਚਾਹੀਦਾ ਹੈ?**

ਕਦੇ ਨਹੀ ਕਦੇ-ਕਦਾਈ ਕਈ ਵਾਰ ਬਹੁਤ ਵਾਰੀ ਹਮੇਸ਼ਾ

4. **ਪਿਛਲੇ 4 ਹਫਤਿਆਂ ਵਿੱਚ, ਆਪਣੇ ਸਿਰਦਰਦ ਦੇ ਕਾਰਨ ਤੁਸੀ ਕਿੰਨੀ ਵਾਰ ਕੰਮ ਕਰਨ ਜਾਂ ਰੋਜ਼ਾਨਾ ਗਤੀਵਿਧੀਆਂ ਕਰਨ ਲਈ ਬਹੁਤ ਥੱਕੇ ਮਹਿਸੂਸ ਕੀਤਾ?**

ਕਦੇ ਨਹੀ ਕਦੇ-ਕਦਾਈ ਕਈ ਵਾਰ ਬਹੁਤ ਵਾਰੀ ਹਮੇਸ਼ਾ

5. **ਪਿਛਲੇ 4 ਹਫਤਿਆਂ ਵਿੱਚ, ਆਪਣੇ ਸਿਰਦਰਦ ਦੇ ਕਾਰਨ ਤੁਸੀ ਕਿੰਨੀ ਵਾਰ ਅੱਕੇ ਹੋਏ ਜਾਂ ਚਿੜਚਿੜਾ ਮਹਿਸੂਸ ਕੀਤਾ?**

ਕਦੇ ਨਹੀ ਕਦੇ-ਕਦਾਈ ਕਈ ਵਾਰ ਬਹੁਤ ਵਾਰੀ ਹਮੇਸ਼ਾ

6. **ਪਿਛਲੇ 4 ਹਫਤਿਆਂ ਵਿੱਚ, ਕਿੰਨੀ ਵਾਰ ਸਿਰਦਰਦ ਨੇ ਤੁਹਾਡੀ ਕੰਮ ਜਾਂ ਰੋਜ਼ਾਨਾ ਗਤੀਵਿਧੀਆਂ ਉੱਤੇ ਧਿਆਨ ਕੇਂਦਰਿਤ ਕਰਨ ਦੀ ਯੋਗਤਾ ਨੂੰ ਸੀਮਿਤ ਕੀਤਾ?**

ਸਫੇਦ ਰੇਖ 36-78 ਹੈ।

ਕਦੇ ਨਹੀ	ਕਦੇ-ਕਦਾਈ	ਕਈ ਵਾਰ	ਬਹੁਤ ਵਾਰੀ	ਹਮੇਸ਼ਾ
ਕਾਲਮ 1 (ਹੁਰੇਕ ਦੇ 6 ਅੰਕ)	ਕਾਲਮ 2 (ਹੁਰੇਕ ਦੇ 8 ਅੰਕ)	ਕਾਲਮ 3 (ਹੁਰੇਕ ਦੇ 10 ਅੰਕ)	ਕਾਲਮ 4 (ਹੁਰੇਕ ਦੇ 11 ਅੰਕ)	ਕਾਲਮ 5 (ਹੁਰੇਕ ਦੇ 13 ਅੰਕ)

ਸਕੋਰ ਦੇਣ ਲਈ, ਹਰੇਕ ਕਾਲਮ ਵਿੱਚ ਉੱਤਰਾਂ ਦੇ ਅੰਕ ਜੋੜੋ।
ਕਿਰਪਾ ਆਪਣੇ HIT-6 ਨਤੀਜੇ ਆਪਣੇ ਡਾਕਟਰ ਨਾਲ ਸਾਝਾ ਕਰੋ।

ਕੁੱਲ ਸਕੋਰ

ਉੱਚੇ ਸਕੋਰ ਤੁਹਾਡੇ ਜੀਵਨ
ਉੱਤੇ ਉੱਚਾ ਪ੍ਰਭਾਵ ਦਰਸਾਉਦੇ ਹਨ।

GAD 7

GAD-7 Anxiety

Over the last two weeks, how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to sleep or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid, as if something awful might happen	0	1	2	3

Column totals _____ + _____ + _____ + _____ =

Total score _____

If you checked any problems, how difficult have they made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult
☐	☐	☐	☐

Source: Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PRIME-MD-PHQ). The PHQ was developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke, and colleagues. For research information, contact Dr. Spitzer at ris8@columbia.edu. PRIME-MD® is a trademark of Pfizer Inc. Copyright© 1999 Pfizer Inc. All rights reserved. Reproduced with permission

GAD 7 PUNJABI VERSION

ਇਨਰੋਲਮੈਂਟਪ੍ਰਸ਼ਨਾਵਲੀ – 7

ਸ ੰ	ਪਿਛਲੇ ਦੋ ਹਫਤਿਆਂਵਿਚਹੇਠਲਿਖੀਆਂਸਮੱਸਿਆਵਾਂਨਾਲਤੁਸੀਂ ਕੰਨੇਕੇਪਰੇਸ਼ਾਨਹੋਏ ਹੋ?	ਬਿਲਕੁਲ ਨਹੀ	ਕਈਂ ਦਨ	ਅੱਧੇਦਿਨਤੋਜਿ ਆਦਾ	ਤਕਰੀਬਨਹ ਰਰੋਜ਼
1	ਘਬਰਾਹਟਮਹਿਸੂਸਕਰਨੀ, ਫਿਕਰਕਰਨਾਜਾਂਖਤਰਾਮਹਿਸੂਸਕਰਨਾ	0	1	2	3
2	ਚਿੰਤਾਕੀਤੇਬਿਨਾਨਾਰਹਿਣਾਜਾਂਚਿੰਤਾਕਰਨਤੋਅਸ ਮਰਥ	0	1	2	3
3	ਹਰਗਲਬਾਰੇਵਾਧੂਚਿੰਤਾਕਰੀਜਾਣੀ	0	1	2	3
4	ਆਰਾਮਕਰਨਵਿਚਮੁਸ਼ਕਲਹੋਣੀ	0	1	2	3
5	ਇਤਨਾਬੇਚੈਨ ਹੋ ਜਾਣਾਕਿਇਕ ਥਾਂ ਬੈਠਣਾਮੁਸ਼ਕਲ ਹੋ ਜਾਣਾ	0	1	2	3
6	ਅਸਾਨੀਨਾਲਗੁੱਸੇਜਾਂਚਿੜਚਿੜਾ ਹੋ ਜਾਣਾ	0	1	2	3
7	ਐਂਵੇਡਰੀਜਾਣਾਕਿਕੁਝਮਾੜਾਨਾ ਹੋ ਜਾਵੇ	0	1	2	3

ਜੇਕਰਤੁਸੀਕਿਸੇਖਾਣੇਵਿਚਕਿਸੇਸਮੱਸਿਆਬਾਰੇਨਿਸ਼ਾਨਲਗਾਇਆਹੈਤਾਂਇਨ੍ਹਾਂਸਮੱਸਿਆਵਾਂਨਾਲਤੁਹਾਨੂੰਕਿੰਨਾਕੁਮੁਸ਼ ਕਲ ਹੋ ਗਿਆਹੈ; ਆਪਣਾਕੰਮਕਰਨਾ, ਘਰ ਦੀਆਂਹੋਰਗਲਾਂਦਾਖਿਆਲਰਖਣਾ, ਜਾਂਦੂਸਰਿਆਂਲੋਕਾਂਨਾਲਮਿਲਣਾਵਰਤਣਾ?

ਕੋਈਮੁਸ਼ਕਲਨਹੀ☐ਥੋੜੀਮੁਸ਼ਕਲ☐ਬਹੁਤਮੁਸ਼ਕਲ☐ਬਹੁਤਜਿਆਦਾਮੁਸ਼ਕਲ☐

NDDI-E

Neurological Disorders Depression Inventory in Epilepsy (NDDI-E)

Name: _____ **Date:** _____

For the statements below, please circle the number that best describes you over the *last two weeks including today.*

	Always or Often	Sometimes	Rarely	Never
Everything is a struggle	4	3	2	1
Nothing I do is right	4	3	2	1
Feel guilty	4	3	2	1
I'd be better off dead	4	3	2	1
Frustrated	4	3	2	1
Difficulty finding pleasure	4	3	2	1

NDDI-E PUNJABI VERSION

ਇਨਰੋਲਮੇਂਟ ਪ੍ਰਸ਼ਨਾਵਲੀ -7

ਬੁਰੀ ਘਟਨਾ	ਹਮੇਸ਼ਾ ਜਾਂ ਕਦੇ	ਕਦੇ ਕਦੇ	ਬਹੁਤ ਘੱਟ	ਕਦੇ
ਹਮੇਸ਼ਾ ਜੱਦੋ ਜਹਿਦ				
ਕੁਝ ਵੀ ਸਹੀ ਨਹੀ ਹੈ				
ਕਸੂਰਵਾਰ ਮਹਿਸੂਸ ਕਰਨਾ				
ਚੰਗਾ ਹੁੰਦਾ ਅਗਰ ਮੈਂ ਮਰ ਜਾਂਦਾ				
ਮਰਜਾਂਵਾ				
ਮੁਸ਼ਕਲ ਨਾਲ ਖੁਸ਼ ਹੋਣਾ				

OUTCOME PARAMETERS

Risk factors for migraine will be assessed in patients with new onset epilepsy.

STATISTICAL ANALYSIS

Data will be described in terms of range; mean ± standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. All statistical calculations will be done using SPSS (Statistical Package for the Social Science) SPSS 21 version statistical program for Microsoft Windows.

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

NO

7.4 HAS ETHICAL CLEARENCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7

ATTACHED HEREWITH

8.0 LIST OF REFERENCES

1. Bauer PR, CarpayJA, Terwindt GM, Sander JW, Thijs RJ, Haan J, et al. Headache and epilepsy. Curr Pain Headache Rep. 2013;17:1-9.
2. Anderman F. Clinical features of migraine–epilepsy syndrome. In:Andermann F, Lugaresi E, editors. Migraine and epilepsy. Boston: Butterworth; 1987. p. 20-89.
3. Panayiotopoulos CP. Difficulties in differentiating migraine and epilepsy based on clinical EEG findings. In: Andermann F, Lugaresi E, editors. Migraine and epilepsy. Boston: Butterworth; 1987. p. 142-51.
4. Parisi P, Kasteleijn-NolstTrenite´ DGA. “Migralepsy”: a call for revision of the definition. Epilepsia. 2010;51:932-3.
5. SomjenGG. Mechanisms of spreading depression and hypoxic spreading depression-like depolarization. Physiol Rev. 2001;81:1065-96.
6. Berger M, SpeckmannEJ, Pape HC, Gorji A. Spreading depression enhances human neocortical excitability in vitro. Cephalalgia. 2008;28:558-62.
7. Verrotti A, Striano P, Belcastro V, Matricardi S, Villa MP, Parisi P. Migralepsy and related conditions: advances in pathophysiology and classification. Seizure. 2011;20:271-5.
8. Definition of Epilepsy 2014. International League against Epilepsy. Available from: https://www.ilae.org/guidelines/ definition-and-classification/definition-of-epilepsy-2014. [Last accessed on 2021 june 21].
9. Epilepsy. World Health Organization. Available from: http://www.who.int/news-room/fact-sheets/detail/epilepsy. [Last accessed on 2021 June 21]
10. Dhiman V, Menon G, Kaur S, Mishra A, John D, Rao Vishnu M, et al. A Systematic Review and Meta-analysis of Prevalence of

Epilepsy, Dementia, Headache, and Parkinson Disease in India. Neurology India.2021;69:294-301.

11. Whealy MA, Myburgh A, BredesenTJ, Britton JW. Headache in epilepsy: A prospective observational study. Epilepsia Open. 2019;4:593-8.
12. Keezer MR, Bauer PR, Ferrari MD, Sander JW. The comorbid relationship between migraine and epilepsy: A systematic review and meta-analysis. Eur J Neurol. 2015;22:1038-47
13. Jankovic, J., Mazziotta, J., Pomeroy, S., Newman, N. and Bradley, W., 2021. Bradley's neurology in clinical practice. 8th ed. p.1619.
14. Scheffer IE, Berkovic S, Capovilla G, Connolly MB, French J, Guilhoto L, et al. ILAE classification of the epilepsies: Position paper of the ILAE Commission for Classification and Terminology. Epilepsia. 2017;58:512-21.
15. ICHD-3. 2021. The International Classification of Headache Disorders - ICHD-3. [online] Available at: <https://ichd-3.org/> [Accessed 27 July 2021].
16. Garg D, Tripathi M. Borderlands of Migraine and Epilepsy. Neurol India. 2021;69:91-7
17. Andermann F. Migraine-epilepsy relationships. Epilepsy Research.1987;1:213-26.
18. Ottman R, Lipton RB. Comorbidity of migraine and epilepsy. Neurology. 1994;44:2105-10.
19. Jabbehdari S, Hesami O, Chavoshnejad M. Prevalence of Migraine Headache in Epileptic Patients. Acta Med Iran. 2015;53:373-5.
20. Fisher RS, Acevedo C, Arzimanoglou A, Bogacz A, Cross JH, Elger CE, et al. ILAE official report: a practical clinical definition of epilepsy. Epilepsia. 2014;55:475-82.

DEPARTMENT OF NEUROLOGY

DAYANANAD MEDICAL COLLEGE AND HOSPITAL, LUDHIANA

PROFORMA

Date:_____ MRD NO _____ Sr. No_____

Name :_____

Age/SEX_____

Father's/Husband name:_____

Occupation:_____

Address:_____

Phone No:_____

Socioeconomic status_____

H/o epilepsy:_____

Seizure semiology:_____

Age at onset of epilepsy :_____

Frequency of seizures_____/_____

History of migraine- Yes/No

Frequency of migraine _____attacks/_____

Age of onset of migraine_____ yrs

Triggering factors for migraine : -

- Stress
- Hormonal fluctuation
- Food deprivation
- Weather fluctuation
- Sleep deprivation
- Perfume or odours
- Bright lights
- Alcohol
- Exercise
- Any other

Signature of Candidate

Signature of Supervisor

Risk factors for Migraine :-

Family history

Obesity

Oral contraceptive use

Any other

Family history of Epilepsy/ diabetes/ hypertension/ asthma,/TB/ Migraine/any other.-

_____

Past history:_____

Menstrual history_____

H/O drug allergy (if any):_____

General Physical Examination

Height:____ Weight:_____pallor :__icterus:___clubbing
Cyanosis:_____Oedema:___Lymphdenopathy_____

BP:_____mmHgPulse :_____bpm Respiratory Rate_____/min

Systemic Examination

CNS:_____

CVS:_____

Respiratory-

_____

Abdomen:_____

Signature of Candidate **Signature of Supervisor**

DRUG DOSE TITRATION DIARY

S.NO	Name of the drug	Dose	Frequency	Start date	Stop date	Dose modfication date	Modified dose	Adverse drug reaction
1.								
2.								
3.								
4.								
5.								
6.								
7.								

HEADACHE CALENDAR

Name Age/Sex Date:

S.No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jan																															
Feb																															
Mar																															
Apr																															
May																															
Jun																															
Jul																															
Aug																															
Sep																															
Oct																															
Nov																															
Dec																															

X = Migrane

O= Menstruation

Signature of Candidate

Signature of Supervisor

HIT 6

HIT-6™
(VERSION 1.1)

HEADACHE IMPACT TEST™

This questionnaire was designed to help you describe and communicate the way you feel and what you cannot do because of headaches.

To complete, please circle one answer for each question.

1 When you have headaches, how often is the pain severe?

Never | Rarely | Sometimes | Very Often | Always

2 How often do headaches limit your ability to do usual daily activities including household work, work, school, or social activities?

Never | Rarely | Sometimes | Very Often | Always

3 When you have a headache, how often do you wish you could lie down?

Never | Rarely | Sometimes | Very Often | Always

4 In the past 4 weeks, how often have you felt too tired to do work or daily activities because of your headaches?

Never | Rarely | Sometimes | Very Often | Always

5 In the past 4 weeks, how often have you felt fed up or irritated because of your headaches?

Never | Rarely | Sometimes | Very Often | Always

6 In the past 4 weeks, how often did headaches limit your ability to concentrate on work or daily activities?

Never | Rarely | Sometimes | Very Often | Always

COLUMN 1 (6 points each)	+	COLUMN 2 (8 points each)	+	COLUMN 3 (10 points each)	+	COLUMN 4 (11 points each)	+	COLUMN 5 (13 points each)

To score, add points for answers in each column.

Please share your HIT-6 results with your doctor.

Total Score ☐

Higher scores indicate greater impact on your life.

Score range is 36-78.

Signature of Candidate

Signature of Supervisor

HIT 6 PUNJABI VERSION

HIT-6™

(ਸੰਸਕਰਨ 1.1)

ਸਿਰਦਰਦ

ਪ੍ਰਭਾਵ ਟੈਸਟ"

ਇਹ ਪ੍ਰਸ਼ਨਾਵਲੀ ਸਿਰਦਰਦ ਦੇ ਭਾਰਨ ਕਿਸ ਤਰ੍ਹਾਂ ਤੁਸੀਂ ਮਹਿਸੂਸ ਕਰਦੇ ਹੋ ਅਤੇ ਤੁਸੀਂ ਸੋ ਨਹੀਂ ਕਰ ਸਕਦੇ ਹੋ ਉਸ ਨੂੰ ਦਰਸਾਉਣ ਅਤੇ ਸੰਚਾਰ ਕਰਨ ਵਿੱਚ ਤੁਹਾਡੀ ਮੱਦਦ ਕਰਨ ਲਈ ਤਿਆਰ ਕੀਤੀ ਗਈ ਹੈ।

ਪ੍ਰਸ਼ਨ ਪੂਰਨ ਲਈ, ਕਿਰਪਾ ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਲਈ ਇੱਕ ਉੱਤਰ ਚੁਣੋ ਅਤੇ ਚੁਣਵੇਂ ਬਕਸੇ ਨੂੰ ਚਿੰਨ੍ਹਿਤ ਕਰੋ।

1. ਜਦੋਂ ਤੁਹਾਨੂੰ ਸਿਰਦਰਦ ਹੁੰਦਾ ਹੈ, ਕਿੰਨੀ ਵਾਰ ਦਰਦ ਤਿਆਨਕ ਹੁੰਦੀ ਹੈ?

ਕਦੇ ਨਹੀਂ | ਕਦੇ-ਕਦਾਈਂ | ਅਕਸਰ | ਬਹੁਤ ਵਾਰੀ | ਹਮੇਸ਼ਾ

2. ਕਿੰਨੀ ਵਾਰ ਸਿਰਦਰਦ ਤੁਹਾਡੀ ਰੋਜ਼ਾਨਾ ਗਤੀਵਿਧੀਆਂ ਜਿਹਨਾ ਵਿੱਚ ਘਰੇਲੂ ਕੰਮ, ਕੰਮ, ਸਕੂਲ, ਜਾਂ ਸਮਾਜਿਕ ਗਤੀਵਿਧੀਆਂ ਸ਼ਾਮਿਲ ਹਨ ਨੂੰ ਕਰਨ ਦੀ ਯੋਗਤਾ ਨੂੰ ਸੀਮਿਤ ਕਰਦਾ ਹੈ?

ਕਦੇ ਨਹੀਂ | ਕਦੇ-ਕਦਾਈਂ | ਅਕਸਰ | ਬਹੁਤ ਵਾਰੀ | ਹਮੇਸ਼ਾ

3. ਜਦੋਂ ਤੁਹਾਨੂੰ ਸਿਰਦਰਦ ਹੁੰਦਾ ਹੈ, ਕਿੰਨੀ ਵਾਰ ਤੁਸੀਂ ਇੱਛਾ ਕੀਤੀ ਕਿ ਤੁਹਾਨੂੰ ਲੇਟ ਜਾਣਾ ਚਾਹੀਦਾ ਹੈ?

ਕਦੇ ਨਹੀਂ | ਕਦੇ-ਕਦਾਈਂ | ਅਕਸਰ | ਬਹੁਤ ਵਾਰੀ | ਹਮੇਸ਼ਾ

4. ਪਿਛਲੇ 4 ਹਫ਼ਤਿਆਂ ਵਿੱਚ, ਆਪਣੇ ਸਿਰਦਰਦ ਦੇ ਕਾਰਨ ਤੁਸੀਂ ਕਿੰਨੀ ਵਾਰ ਕੰਮ ਕਰਨ ਜਾਂ ਰੋਜ਼ਾਨਾ ਗਤੀਵਿਧੀਆਂ ਕਰਨ ਲਈ ਬਹੁਤ ਥੱਕੇ ਮਹਿਸੂਸ ਕੀਤਾ?

ਕਦੇ ਨਹੀਂ | ਕਦੇ-ਕਦਾਈਂ | ਅਕਸਰ | ਬਹੁਤ ਵਾਰੀ | ਹਮੇਸ਼ਾ

5. ਪਿਛਲੇ 4 ਹਫ਼ਤਿਆਂ ਵਿੱਚ, ਆਪਣੇ ਸਿਰਦਰਦ ਦੇ ਕਾਰਨ ਤੁਸੀਂ ਕਿੰਨੀ ਵਾਰ ਅੱਕੇ ਹੋਏ ਜਾਂ ਚਿੜਚਿੜਾ ਮਹਿਸੂਸ ਕੀਤਾ?

ਕਦੇ ਨਹੀਂ | ਕਦੇ-ਕਦਾਈਂ | ਅਕਸਰ | ਬਹੁਤ ਵਾਰੀ | ਹਮੇਸ਼ਾ

6. ਪਿਛਲੇ 4 ਹਫ਼ਤਿਆਂ ਵਿੱਚ, ਕਿੰਨੀ ਵਾਰ ਸਿਰਦਰਦ ਨੇ ਤੁਹਾਡੀ ਕੰਮ ਜਾਂ ਰੋਜ਼ਾਨਾ ਗਤੀਵਿਧੀਆਂ ਪ੍ਰੰਤੇ ਧਿਆਨ ਕੇਂਦਰਿਤ ਕਰਨ ਦੀ ਯੋਗਤਾ ਨੂੰ ਸੀਮਿਤ ਕੀਤਾ?

ਸਕੋਰ ਰੇਂਜ 36-78 ਹੈ।

ਕਦੇ ਨਹੀਂ | ਕਦੇ-ਕਦਾਈਂ | ਅਕਸਰ | ਬਹੁਤ ਵਾਰੀ | ਹਮੇਸ਼ਾ

ਕਾਲਮ 1 (ਹਰੇਕ ਦੇ 6 ਅੰਕ) | ਕਾਲਮ 2 (ਹਰੇਕ ਦੇ 8 ਅੰਕ) | ਕਾਲਮ 3 (ਹਰੇਕ ਦੇ 10 ਅੰਕ) | ਕਾਲਮ 4 (ਹਰੇਕ ਦੇ 11 ਅੰਕ) | ਕਾਲਮ 5 (ਹਰੇਕ ਦੇ 13 ਅੰਕ)

ਸਕੋਰ ਦੇਣ ਲਈ, ਹਰੇਕ ਕਾਲਮ ਵਿੱਚ ਪ੍ਰੰਤੇਹਾ ਦੇ ਅੰਕ ਜੋੜੋ।
ਕਿਰਪਾ ਆਪਣੇ HIT-6 ਨਤੀਜੇ ਆਪਣੇ ਡਾਕਟਰ ਨਾਲ ਸਾਂਝਾ ਕਰੋ।

ਕੁੱਲ ਸਕੋਰ

ਉੱਚੇ ਸਕੋਰ ਤੁਹਾਡੇ ਜੀਵਨ ਉੱਤੇ ਉੱਚ ਪ੍ਰਭਾਵ ਦਰਸਾਉਂਦੇ ਹਨ।

Signature of Candidate

Signature of Supervisor

GAD 7

GAD-7 Anxiety

Over the last two weeks, how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to sleep or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid, as if something awful might happen	0	1	2	3

Column totals ____ + ____ + ____ + ____ =

Total score _____

If you checked any problems, how difficult have they made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult
☐	☐	☐	☐

Source: Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PRIME-MD-PHQ). The PHQ was developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke, and colleagues. For research information, contact Dr. Spitzer at rls8@columbia.edu. PRIME-MD® is a trademark of Pfizer Inc. Copyright© 1999 Pfizer Inc. All rights reserved. Reproduced with permission

Signature of Candidate

Signature of Supervisor

GAD 7 PUNJABI VERSION

ਇਨਹੋਲਮੈਂਟਪ੍ਰਸ਼ਨਾਵਲੀ – 7

ਸ	ਪਿਛਲੇ ਦੋ ਹਫ਼ਤਿਆਂਦਿਚਹੇਠਲਿਖੀਆਂਸਮੱਸਿਆਵਾਂਨਾਲਤੁਸੀਂ ਕੰਨੇਕੋਪਰੇਸ਼ਾਨਹੋਏ ਹੋ?	ਬਿਲਕੁਲ ਨਹੀ	ਕਈਂ ਦਨ	ਅੱਧਦਿਨਤੋਂਜਿ ਆਦਾ	ਤਕਰੀਬਨਹ ਰਹੋਜ
1	ਘਬਰਾਹਟਮਹਿਸੂਸਕਰਨੀ, ਫਿਕਰਕਰਨਾਜਾਂਖਤਰਾਮਹਿਸੂਸਕਰਨਾ	0	1	2	3
2	ਚਿੰਤਾਕੀਤੇਬਿਨਾਨਾਰਹਿਣਾਜਾਂਚਿੰਤਾਨਾਕਰਨਤੋਂਅਸਮਰਥ	0	1	2	3
3	ਹਰਗਲਬਾਰੇਵਾਧੂਚਿੰਤਾਕਰੀਜਾਣੀ	0	1	2	3
4	ਆਰਾਮਕਰਨਵਿਚਮੁਸ਼ਕਲਹੋਣੀ	0	1	2	3
5	ਇਤਨਾਬੇਚੈਨ ਹੋ ਜਾਣਾਕਿਇਕ ਥਾਂ ਬੈਠਣਾਮੁਸ਼ਕਲ ਹੋ ਜਾਣਾ	0	1	2	3
6	ਅਸਾਨੀਨਾਲਖ਼ੁਸੇਜਾਂਚਿੜਚਿੜਾ ਹੋ ਜਾਣਾ	0	1	2	3
7	ਐਵੇਡਰੀਜਾਣਾਕਿਕੁਝਮਾੜਾਨਾ ਹੋ ਜਾਵੇ	0	1	2	3

ਜੇਕਰਤੁਸੀਕਿਸੇਖਾਣੇਵਿਚਕਿਸੇਸਮੱਸਿਆਬਾਰੇਨਿਸ਼ਾਨਲਗਾਇਆਹੈਤਾਂਇਨ੍ਹਾਂਸਮੱਸਿਆਵਾਂਨਾਲਤੁਹਾਨੂੰਕਿੰਨਾਕੁਮੁਸ਼ਕਲ ਹੋ ਗਿਆਹੈ; ਆਪਣਾਕੰਮਕਰਨਾ, ਘਰ ਦੀਆਂਹੋਰਗਲਾਂਦਾਖਿਆਲਰਖਣਾ, ਜਾਂਦੂਸਰਿਆਂਲੋਕਾਂਨਾਲਮਿਲਣਾਵਰਤਣਾ?

ਕੋਈਮੁਸ਼ਕਲਨਹੀ☐ਥੋੜੀਮੁਸ਼ਕਲ☐ਬਹੁਤਮੁਸ਼ਕਲ☐ਬਹੁਤਜਿਆਦਾਮੁਸ਼ਕਲ☐

NDDI-E

Neurological Disorders Depression Inventory in Epilepsy (NDDI-E)

Name: _____ **Date:** _____

For the statements below, please circle the number that best describes you over the *last two weeks including today.*

	Always or Often	Sometimes	Rarely	Never
Everything is a struggle	4	3	2	1
Nothing I do is right	4	3	2	1
Feel guilty	4	3	2	1
I'd be better off dead	4	3	2	1
Frustrated	4	3	2	1
Difficulty finding pleasure	4	3	2	1

Signature of Candidate

Signature of Supervisor

NDDI-E PUNJABI VERSION

ਇਨਰੋਲਮੈਂਟ ਪ੍ਰਸ਼ਨਾਵਲੀ -7

ਬੁਰੀ ਘਟਨਾ	ਹਮੇਸ਼ਾ ਜਾਂ ਕਦੇ	ਕਦੇ ਕਦੇ	ਬਹੁਤ ਘੱਟ	ਕਦੇ
ਹਮੇਸ਼ਾ ਜੱਦੋ ਜਹਿਦ				
ਕੁਝ ਵੀ ਸਹੀ ਨਹੀ ਹੈ				
ਕਸੂਰਵਾਰ ਮਹਿਸੂਸ ਕਰਨਾ				
ਚੰਗਾ ਹੁੰਦਾ ਅਗਰ ਮੈਂ ਮਰ ਜਾਂਦਾ				
ਮਰਜਾਂਵਾ				
ਮੁਸ਼ਕਲ ਨਾਲ ਖੁਸ਼ ਹੋਣਾ				

Signature of Candidate

Signature of Supervisor

INFORMED PATIENT CONSENT

Date: _____

I……..D/o, W/o, S/o…….. ……am willing to participate in the study **" RISK FACTORS FOR MIGRAINE IN PEOPLE WITH EPILEPSY"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

……. ……
Signature of the Witness Signature of the patient

Name:

Signature of Candidate **Signature of Supervisor**

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____ निवासी _____ इस शोधकार्य "**RISK FACTORS FOR MIGRAINE IN PEOPLE WITH EPILEPSY"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____ _____

गवाह के हस्ताक्षर रोगी के हस्ताक्षर/अंगूठे का निशान

नाम: नाम:

_____

अन्वेषक के हस्ताक्षर

_____

विद्यार्थी के हस्ताक्षर

□□□□□ □□□□□□□□□ □□□□

□□□□_____

□□_____□□□□□/□□□□□□/□□□□□□□_____

_____

□□□□

_____

“RISK FACTORS FOR MIGRAINE IN PEOPLE WITH EPILEPSY”

□□ □□ □□□□ □□□□ □□□□ □□□□□□ □□□□ □□ □□□□□□□□ □□□□| □□ □□□□ □□□□ □□□□ □□□□□□ □□□□ □□ □□ □□□□□ □□□□□□ □□□□ □□□□□ □□□□| □□ □□ □□□□□ □□□□□□□□ □□□□/ □□□□□□□□ □□□□ □□ □□ □□□□□□□□□□ □□□□ □□□□□□ □□□□□ □□□□□ □□ □□□□□ □□ □□□□-□□□□□ □□□□ □□□□□□ □□□□ □□□□ □□ □□ □□□□ □□□□ □□□□□ □□□□ □□□| □□□□□ □□ □□□□ □□ □□□□□□ □□□□□ □□□□□□ □□□□ □□□□ □□ □□□□ □□□□□ □□ □□□□□□ □□□□□□ □□□□ □□ □□ □□ □□□□ □□□□□□□ □□□□ □□□□□□□ □□ □□□□□ □□ □□□| □□□□□ □□ □□□□ □□□□ □□□□ □□□□□ □□□□□ □□□□□ □□□□□ □□□□□□ □□□□ □□ □□□□ □□□□□ □□ □□□□□ □□ □□ □□ □□□□□ □□□□□ □□□□□□□ □□| □□□□□ □□ □□□□ □□□□ □□□□ □□□□□□ □□□□ □□ □□□□ – □□□□□□ □□□□□ □□□□□□ □□□□ □□|

□□ □□ □□□□ □□□□ □□□□ □□□□□□ □□□□ □□□□□ □□□□□ □□□□□□□□□ □□□□□ □□ □□□□ □□□□□ □□ □□□□□ □□□□/ □□□□□ □□□□ □□□□ □□□□□ □□□□□□□□□ □□□□□ □□□□ □□ □□□□□ □□□□□ □□ □□□□ □□□□ □□□□ □□□□□□□|

_____ _____

□□□□ □□ □□□□□□□ □□□□□□ □□ □□□□□□□

□□□□_____ □□□□_____

□□□ _____ □□□ _____

_____

□□□□□□□ □□ □□□□□□□

_____

□□□□□□□□□ □□ □□□□□□□